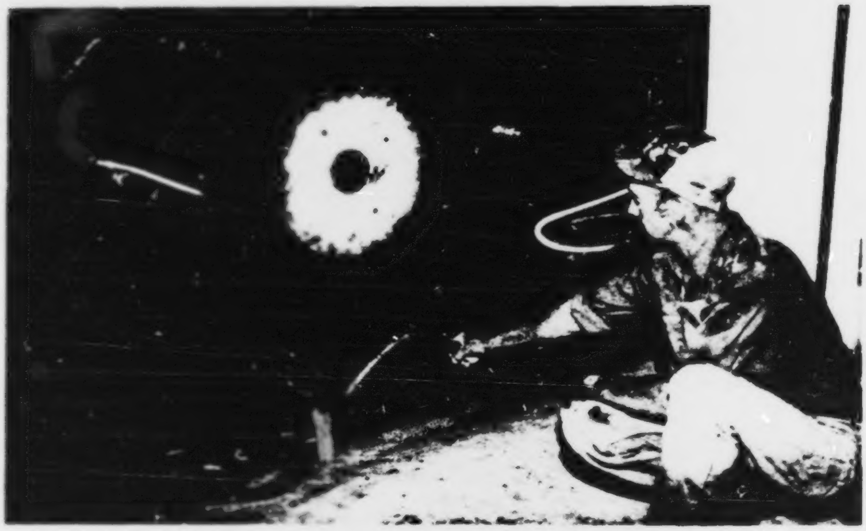
MANITOBA CANADA CONSERVATION AND RENEWABLE ENERGY DEMONSTRATION AGREEMENT

Energy, Mines and
Resources Canada

Energie, Mines et
Ressources Canada

Manitoba
Energy and Mines

PREPARED BY:
INDUSTRIAL TECHNOLOGY CENTRE/
MANITOBA RESEARCH COUNCIL
WINNIPEG, MANITOBA



SMALL SCALE ENERGY DEMONSTRATION PROGRAM

MG 13092

82.122
MARCH 1985

SUMMARY

Sixty-six projects were sponsored under the Small Scale Energy Demonstration Program. This program provided funding assistance to individuals, small businesses, municipalities and non-profit organizations in Manitoba for the demonstration of conservation and renewable energy technologies. The program was funded under the Canada/Manitoba Energy Demonstration Agreement on a 50/50 basis by Energy, Mines and Resources Canada and the Manitoba Department of Energy and Mines.

Projects approved and funded included heat pumps, energy management, waste heat recovery, wood heating, biomass and alternate fuels, active and passive solar, wind energy and solar greenhouses. Funding assistance varied between 50 and 75% of project costs to a maximum of $7,500.

This report contains individual project summary sheets providing a description and economic analysis of each project.

SOMMAIRE

Soixante-six projets ont été parrainés dans le cadre du Programme de démonstration énergétique à petite échelle (Small Scale Energy Demonstration Program), dont l'objectif était d'accorder des subventions aux particuliers, aux petites entreprises, aux municipalités et aux organismes sans but lucratif du Manitoba désireux de mettre à l'essai des techniques d'économie d'énergie et d'exploitation d'énergies renouvelables. Le programme était subventionné à parts égales par Énergie, mines et ressources Canada et le ministère de l'Énergie et des mines du Manitoba, dans le cadre du Programme (Canada-Manitoba) de démonstration des énergies renouvelables et des économies d'énergie.

Parmi les projets approuvés et subventionnés, on compte notamment des pompes thermiques, des méthodes de gestion énergétique, la récupération de la chaleur perdue, le chauffage au bois, l'exploitation de la biomasse et des carburants de remplacement, de l'énergie solaire active et passive, de l'énergie éolienne et des serres à chauffage solaire. Les subventions accordées couvraient entre 50 et 75% du coût des projets, jusqu'à concurrence de 7 500 $.

Les projets en question sont exposés dans le présent rapport sous forme de fiches-sommaire donnant une description et une analyse économique de chaque projet.

MANITOBA/CANADA CONSERVATION AND RENEWABLE ENERGY DEMONSTRATION AGREEMENT

The availability of secure and affordable energy supplies is a subject of national concern. It is an accepted fact that our primary energy sources — oil and natural gas — are becoming less accessible and more costly. However, Canada is well-endowed with renewable and alternative resources that can provide a bridge into the future.

To this end, the governments of Manitoba and Canada entered into a Conservation and Renewable Energy Demonstration Agreement which was signed May 9, 1980 and terminated March 31, 1984. The Agreement was dedicated to the development and demonstration of conservation and renewable energy technologies. Equally cost-shared by the provincial and federal governments, the program had a total budget of $18-million.

The objectives of CREDA are:

- To develop and demonstrate promising new technologies, which, when widely adopted, will exploit renewable resources, conserve energy and/or use energy more efficiently.
- To develop broad public awareness of the potential of renewable energy and conservation technology.
- To provide opportunities for the commercial application of the technologies within Manitoba.
- To create economic spin-off benefits for manufacturing, industry and commerce.
- To create employment in new or existing energy-related industries.

Opinions contained in this report are those of the author(s) and are not necessarily those of the Manitoba Department of Energy and Mines, or Energy, Mines and Resources Canada.

Use of company names, brand names or trademarks is made for informational purposes only and does not constitute endorsement or recommendation over similar products or services.

Energy Ideas.

Project Proponent: Mr. Alex Ross

Technology: Active Solar — Space Heating

Project Location:

St. James Sheet Metal
201 King Edward Street
Winnipeg, Manitoba R3J 1L4
(204) 888-5020

Project Cost: $2,130.00

Small Scale Support: $1,600.00

Simple Payback Period: 17 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This active solar installation provides supplementary heating to a sheet metal shop. Air, used as the heat transfer medium, is drawn from the shop through the solar panels and then returned to the shop. A blower, located on the outlet duct, is controlled by a thermostat in the panels. The thermostat is set at 21°C (70°F). There is no provision for heat storage.

The two model 406 solar panels and 1 model CBU-2 blower manufactured by LPC (Canada) Ltd. of Steinbach are being used.

The two insulated and double glazed panels are 1219 x 3048 mm (4 x 10 ft) each, providing a total collector area of 7.43 m^2 (80 ft^2). They are mounted on the roof facing south and 60° to the horizontal.

The blower is rated at 126 L/s (265 ft^3/min) of free air.

LPC estimate an average seasonal output (Sept. 1 to April 30) of each solar panel of 6.9 GJ (6,540,000 Btu) based on a 50% efficiency. For 2 panels this is equivalent to 13.8 GJ (13,080,000 Btu). Based on the above and present day natural gas prices, this installation should return $125.00/year providing a simple payback of 17 years.

The purpose of this project is to demonstrate the economics of operating this installation.

No. 902
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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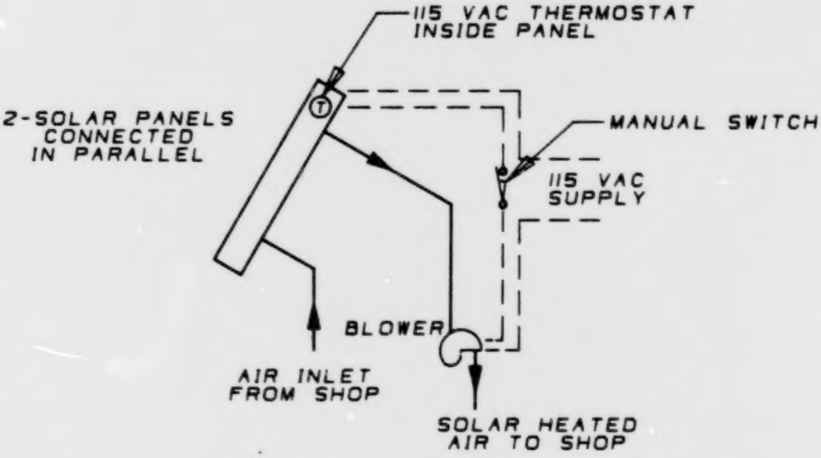
115 VAC THERMOSTAT INSIDE PANEL
2-SOLAR PANELS CONNECTED IN PARALLEL
T
MANUAL SWITCH
115 VAC SUPPLY
BLOWER
AIR INLET FROM SHOP
SOLAR HEATED AIR TO SHOP

ACTIVE SOLAR INSTALLATION

Energy Ideas.

Project Proponent:

Royal Canadian Legion

Technology:

Active Solar — Hot Water

Project Location:
Sports Foundation Inc.
27 St. Anne's Road
Winnipeg, Manitoba R2M 2Y2

(204) 237-6987

Project Cost: $10,000.00

Small Scale Support: $7,500.00

Simple Payback Period:

13.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This active solar installation provides preheating of the domestic hot water supply of a sports complex located at the International Peace Gardens.

Five 1191 x 2459 mm (46.9 x 96.8 in.) Sun Ray Series 48 solar panels connected in parallel are used providing a total collector area of 14.7 m^2 (158 ft^2). The panels are single glazed with tempered glass and are insulated with rigid foam. They are mounted on the roof facing south and 65° to the horizontal.

The absorber consists of parallel copper flow tubes with headers on both ends. The tubes are continuously soldered to a black chrome coated copper sheet.

A Taco SSM1201 solar systemizer containing a pump, counter-flow heat exchanger and differential temperature controller is used. A 50% glycol/water transfer fluid, heated in the collector loop, is pumped through the heat exchanger, where the heat is transferred to fresh water circulated from a pre-heat tank. The preheated water is then supplied to the conventional domestic hot water heaters.

It is estimated that this system will provide 42.2 GJ (40,000,000 Btu) of energy per year based on a 40% efficiency. Since power for the complex is purchased from the United States, the savings should be approximately $733.00/year providing a simple payback of 13.5 years.

The purpose of this project is to demonstrate the economics of operating this system.

No. 903
Region: South Western

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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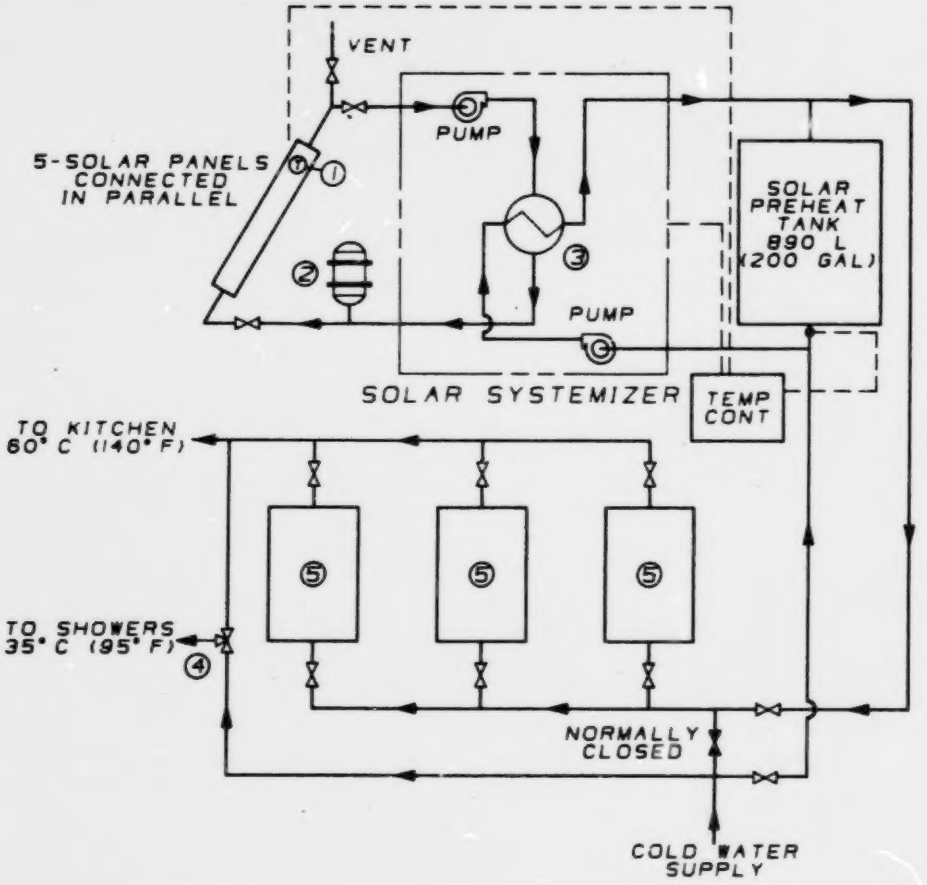
VENT
5-SOLAR PANELS
CONNECTED
IN PARALLEL
①
②
PUMP
③
PUMP
SOLAR
PREHEAT
TANK
890 L
(200 GAL)
SOLAR SYSTEMIZER
TEMP
CONT
TO KITCHEN
60° C (140° F)
⑤
⑤
⑤
TO SHOWERS
35° C (95° F)
④
NORMALLY
CLOSED
COLD WATER
SUPPLY

LEGEND

① TEMPERATURE SENSOR INSIDE PANEL
② EXPANSION TANK
③ HEAT EXCHANGER
④ MIXING VALVE
⑤ ELECTRIC WATER HEATER - 445 L (100 GAL) CAPACITY

ACTIVE SOLAR INSTALLATION

Energy Ideas.

Project Proponent: Neepawa Municipal Swimming Pool	Technology: Active Solar — Swimming Pool
Project Location: c/o Yellowhead Centre Box 1547 Neepawa, Manitoba R0J 1H0	(204) 476-5880
Project Cost: $20,987.00	Simple Payback Period:
Small Scale Support: $7,500.00	5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

Replacing natural gas, this active solar installation provides the primary heating requirements for water in a public outdoor swimming pool. The natural gas heaters remain as the back-up system. Water is the heat transfer medium for the installation.

Fifty model SP-250-10 Petro-Sun solar panels connected in parallel are used. The panels are 1219 x 3048 mm (4 x 10 ft) each providing a total collector area of 186m² (2000 ft²). Thirty of the panels are mounted on an adjacent building facing south and 45° to the horizontal. The remaining 20 panels are mounted on two separate adjacent structures facing south and 35° to the horizontal.

The absorber material of the collectors is 90% polypropylene and 10% polyethylene. There is no glazing on the panels. Water flows up through small channels in the absorber material.

The swimming pool is 15 x 25 m (49 x 82 ft) and holds 705,000 L (155,000 Imp. gal.) of water. Water is maintained in the pool at approximately 27°C (80°F).

The energy requirements for heating the swimming pool are approximately 897 GJ (8.5 x 10^8 Btu) per season costing approximately $4,250.00. The payback period for this installation should be five years, based on the current cost of natural gas.

The purpose of this project is to demonstrate the economics of operating this system.

No.904
Region: South Western

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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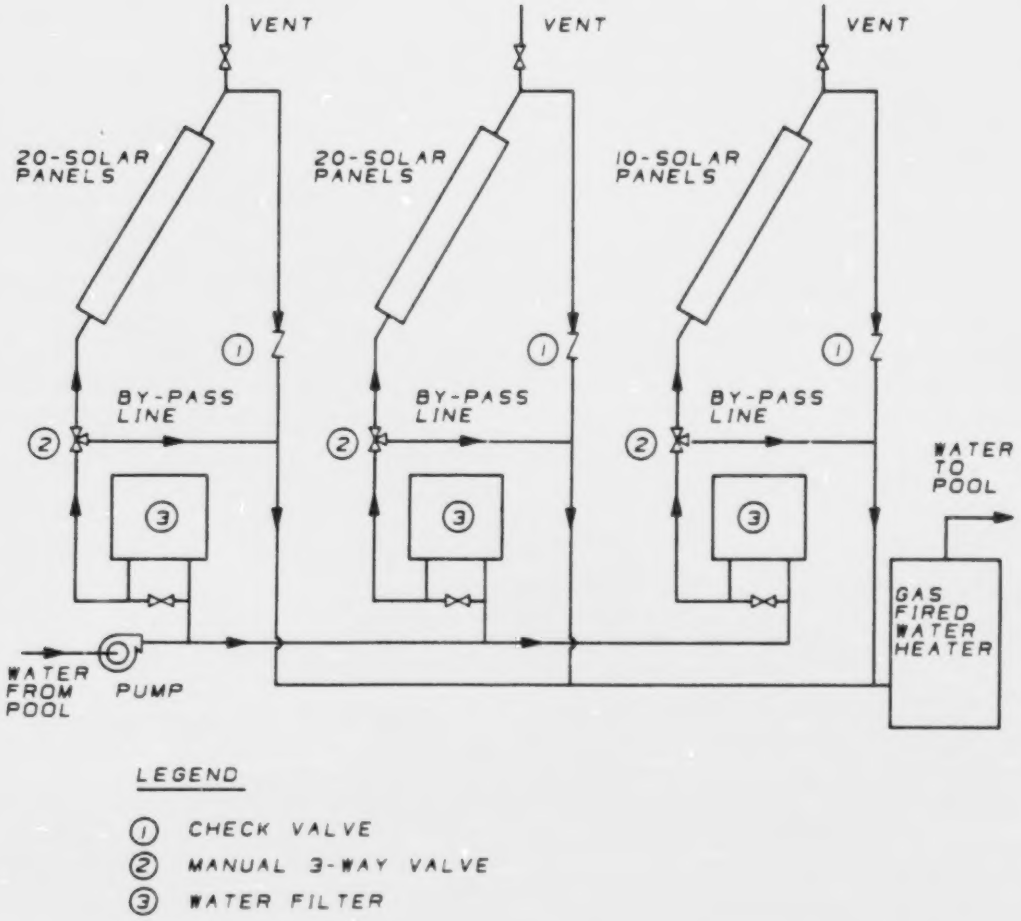
VENT
VENT
VENT
20-SOLAR PANELS
20-SOLAR PANELS
10-SOLAR PANELS
①
BY-PASS LINE
②
③
WATER TO POOL
GAS FIRED WATER HEATER
WATER FROM POOL
PUMP
LEGEND
① CHECK VALVE
② MANUAL 3-WAY VALVE
③ WATER FILTER

ACTIVE SOLAR INSTALLATION

Energy Ideas.

Project Proponent:	Technology:
Meadows Community Club	Active Solar — Space Heating
Project Location:	
Rosser, Manitoba R0H 1E0	(204) 322-5395
Project Cost: $9,733.00	Simple Payback Period
Small Scale Support: $7,300.00	21.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This active solar installation provides supplementary heating to a community club building. Air, used as the heat transfer medium, is drawn from the building, through the solar panels and then returned to the building. Three blowers located on the outlet ducts are controlled by thermostats in the panels. There is no provision for heat storage. The primary heating system is electric forced air.

Eight model 406 solar panels manufactured by LPC (Canada) Ltd. of Steinbach are used. The insulated and double glazed panels are 1219 x 3048 mm (4 x 10 ft) each, providing a total collector area of 29.7 m^2 (320 ft^2).

Two of the solar panels are ducted to the kitchen with 1 model CBU-2 blower provided. Six solar panels are ducted to the hall area with 2 model CBU-3 blowers provided; 1 blower for 3 solar panels. All are mounted on the roof facing south and 60° to the horizontal.

The model CBU-2 blower is rated at 126 L/s (265 ft^3/min) of free air and the model CBU-3 blower is rated at 165 L/s (350 ft^3/min) of free air.

LPC of Canada estimate an average seasonal output (Sept. 1 to April 30) of each solar panel of 6.9 GJ (6,540,000 Btu) based on 50% efficiency. For 8 panels this is equivalent to 15,320 kWh of electricity. At present day electricity prices, this installation should return $460.00/year providing a simple payback of 21.5 years.

However, this building is in use mainly on weekends and evenings. When not in use, an inside temperature of approximately 5°C (41°F) is maintained. The lower building temperatures should result in higher solar collector efficiencies, thus providing a higher output and shorter payback period than above.

The purpose of this project is to confirm the economics of operating this system.

No. 905
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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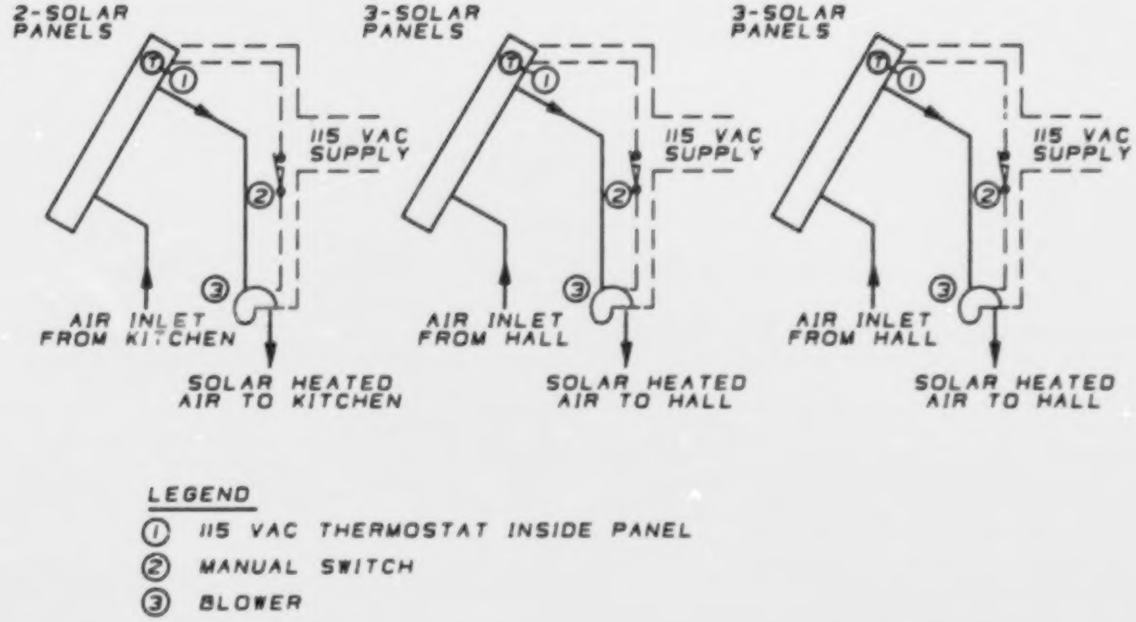
2-SOLAR PANELS
T
①
115 VAC SUPPLY
②
③
AIR INLET FROM KITCHEN
SOLAR HEATED AIR TO KITCHEN
3-SOLAR PANELS
T
①
115 VAC SUPPLY
②
③
AIR INLET FROM HALL
SOLAR HEATED AIR TO HALL
3-SOLAR PANELS
T
①
115 VAC SUPPLY
②
③
AIR INLET FROM HALL
SOLAR HEATED AIR TO HALL
LEGEND
① 115 VAC THERMOSTAT INSIDE PANEL
② MANUAL SWITCH
③ BLOWER

ACTIVE SOLAR INSTALLATION

Energy Ideas.

Project Proponent:

Naturas Inc.

Technology:

Active — Passive Solar

Project Location:

Box 193
St. Pierre, Manitoba R0A 1V0

(204) 772-5553

Project Cost: $10,090.00

Small Scale Support: $7,500.00

Simple Payback Period:

18 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This active-passive solar installation provides supplementary heating of space and preheating of water for an adolescent care centre.

The project involved the following:

1. The glazed area of the south wall of the existing sun space was increased from 4.65 m^2 (50 ft^2) to 12.54 m^2 (135 ft^2). Quad pane sealed windows are used for this installation.
2. A 12.15 m^2 (132 ft^2) active solar collector at ground level, facing south and 65° to the horizontal provides supplementary space heating. The solar collectors are double glazed with Kalwall glass fibre reinforced panels spaced 38 mm (1.5 in) apart. Air, used as the heat transfer medium, is ducted either directly to the building space or to a 3.4 m^3 (120 ft^3) rock heat storage located in the crawl space under the sun space area. A thermostat located in the solar panel and set at 21°C (70°F) controls the air blower. The house thermostat controls a two-way motorized damper which directs warm air to the house during the heat demand cycle or to the rock storage medium during the off cycle. A control panel switches to electric baseboard heating when the solar collectors cannot meet the heat demand.

   Heat is transferred by radiation and natural convection from the rock storage to the sun space. The crawl space perimeter is insulated with 102 mm (4 in) thick rigid foam providng a R-20 insulating value.
3. A 11.89 m^2 (128 ft^2) active solar panel facing south and 60° to the horizontal provides preheating of the domestic hot water. An anti-freeze solution is used in the solar collector loop and heat is transferred to the fresh water in the preheat tank through a heat exchanger. The preheated water is supplied to the electric water heater.

The proponent has estimated a simple payback period of approximately eight years for this project. It is difficult to provide an accurate economic assessment of this installation due to the combinations used. However, it is expected that the payback period will be closer to 18 years.

The purpose of this project is to demonstrate the economics of operating this system.

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No. 906
Region: South Eastern

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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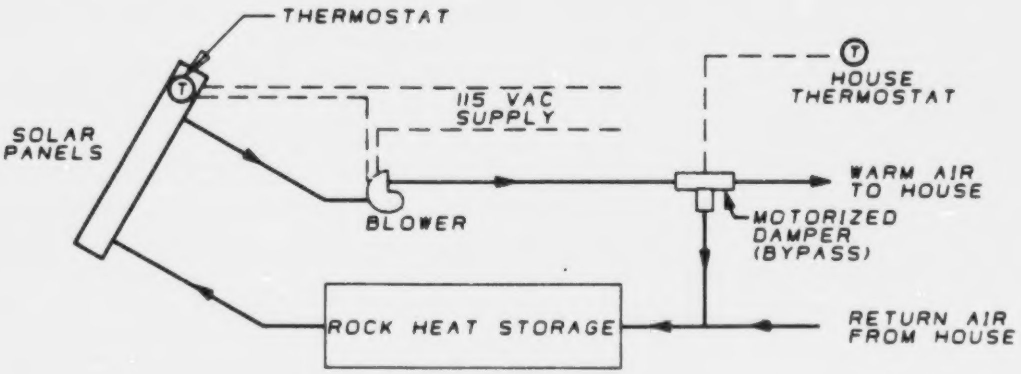
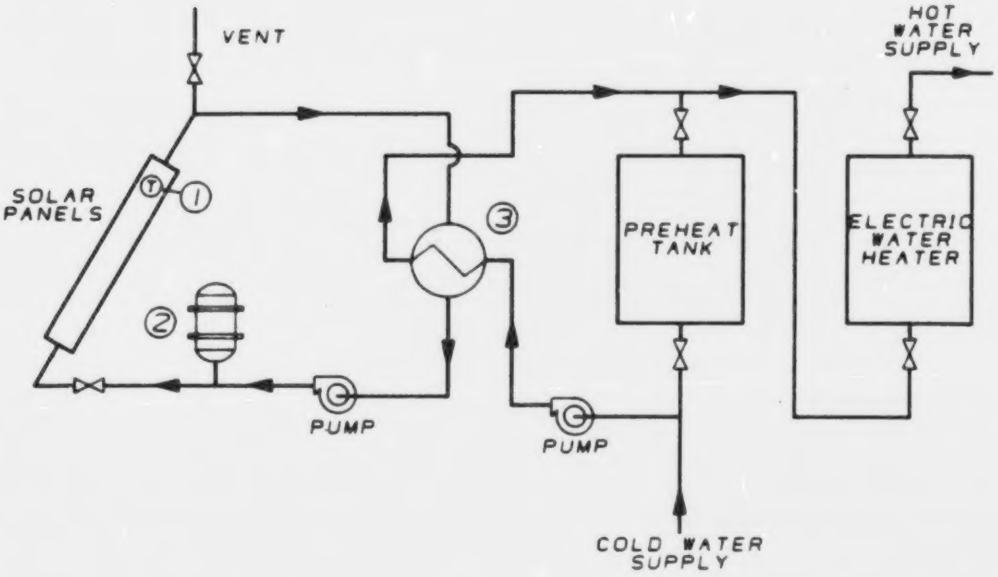

THERMOSTAT
T
SOLAR PANELS
115 VAC SUPPLY
T
HOUSE THERMOSTAT
WARM AIR TO HOUSE
BLOWER
MOTORIZED DAMPER (BYPASS)
ROCK HEAT STORAGE
RETURN AIR FROM HOUSE

ACTIVE SOLAR SPACE HEATING LOOP


VENT
HOT WATER SUPPLY
SOLAR PANELS
T
1
3
2
PREHEAT TANK
ELECTRIC WATER HEATER
PUMP
PUMP
COLD WATER SUPPLY

ACTIVE SOLAR DOMESTIC HOT WATER HEATING LOOP

LEGEND

① TEMPERATURE SENSOR INSIDE PANEL

② EXPANSION TANK

③ HEAT EXCHANGER

ACTIVE SOLAR INSTALLATION

Energy Ideas.

Project Proponent:
Mr. Gundars Runfelds

Technology:
Active Solar — Space Heating

Project Location:
34 Pear Tree Bay
Winnipeg, Manitoba R2N 1S6
(204) 255-8104

Project Cost: $2,380.00
Small Scale Support: $865.00

Simple Payback Period:
24 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This active solar installation provides supplementary heating to a 93 m² (1000 ft²) winterized cottage near Lac du Bonnet, Manitoba.

The 2743 x 3353 mm (9 x 11 ft) solar panel provides a 9.2 m² (99 ft²) collector area and is based on a design from the September/October 1978 issue of "The Mother Earth News".

The panel consists of a wooden box with single glazing into which parallel tubes are run between two headers. These tubes are made by cutting the ends off used fluorescent tubes. A total of 178 tubes are used, two for each pass. The outside of the tubes and inside of the solar panel are painted black. A 70.8 L/s (150 cfm) blower on the solar panel outlet duct draws air from the cottage, through the panel and then back into the cottage. The blower is controlled by a differential thermostat sensing the difference between the panel temperature and the inlet duct temperature. The thermostat is set for a 4°C (7°F) temperature difference.

The panel is mounted vertically on a south wall of the building.

It is difficult to provide an accurate overall economic assessment of this system due to the intermittent use of the cottage. However the collector could provide an average seasonal output (Sept. 1 to April 30) of up to 12 GJ (11,374,000 Btu) assuming a 50% efficiency. This is equivalent to a 3,334 kWh of electricity. Based on the above and present day prices, this installation should return $100.00/year providing a simple payback period of 24 years.

The purpose of this project is to demonstrate the economics of operating this system.

No. 907
Region: East Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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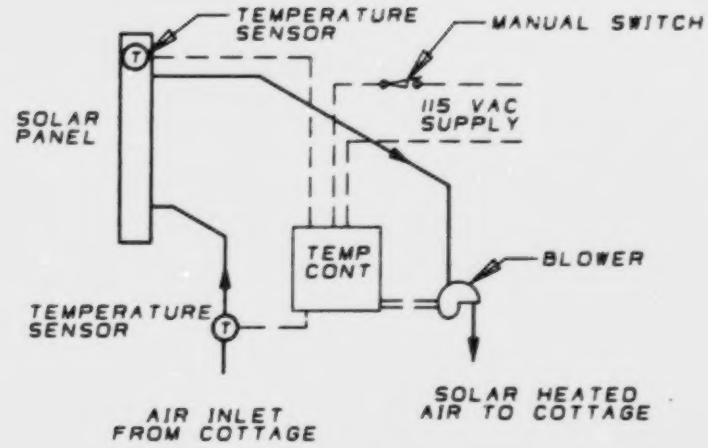
TEMPERATURE SENSOR
MANUAL SWITCH
SOLAR PANEL
115 VAC SUPPLY
TEMP CONT
BLOWER
TEMPERATURE SENSOR
T
T
AIR INLET FROM COTTAGE
SOLAR HEATED AIR TO COTTAGE

ACTIVE SOLAR INSTALLATION

Energy Ideas.

Project Proponent:	Technology:
Mr. Allan Kennedy	Alternate Fuels — Crop Residue
Project Location:	
Box 178 Miami, Manitoba R0G 1H0	(204) 435-2101
Project Cost: $11,302.00	Simple Payback Period:
Small Scale Support: $7,500.00	2 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This crop residue burning furnace provides heating for a 288 m^2 (3100 ft^2) machinery shed and workshop. The heat transfer medium is hot water distributed through a floor radiant heating system The unit may also be used for crop drying and residential heating.

The crop residue burner consists of a combustion chamber with a rotary grate, electrical resistance ignition system, fuel storage, an auger type stoking mechanism and automatic ash removal. A jacketed heat exchanger is provided to heat the water, which is then distributed to the various areas requiring heat. Appropriate control systems will be used for safety purposes.

The system is designed to replace propane and coal with crop residues which are in adequate supply. The present total energy costs are $6,960.00/year. Therefore, this unit should provide a simple payback of approximately two years.

The purpose of this project is to demonstrate the functional operation and economics of this technology.

No. 911
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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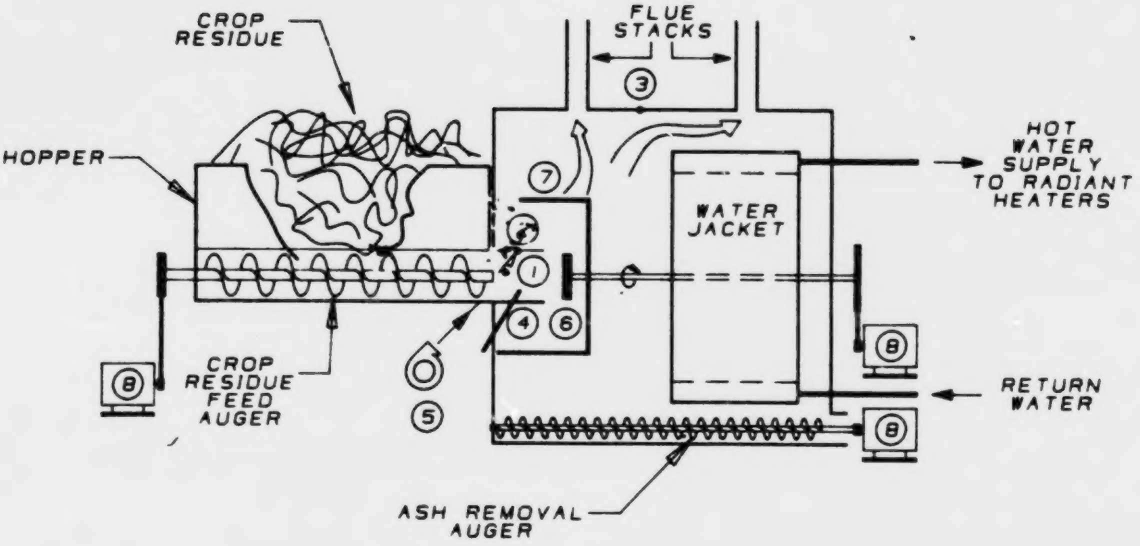
CROP RESIDUE
FLUE STACKS
③
HOPPER
⑦
HOT WATER SUPPLY TO RADIANT HEATERS
WATER JACKET
②
①
④
⑥
⑧
⑧
CROP RESIDUE FEED AUGER
⑤
RETURN WATER
⑧
ASH REMOVAL AUGER

LEGEND

① COMBUSTION CHAMBER
② LIMIT SWITCH CONTROLS FEED AUGER MOTOR
③ UPPER TEMPERATURE LIMIT SENSOR CONTROLS PRIMARY COMBUSTION AIR BLOWER
④ ELECTRICAL RESISTANCE IGNITION
⑤ PRIMARY COMBUSTION AIR BLOWER
⑥ ROTATING RAKE
⑦ ROTARY GRATE - WIRE MESH
⑧ ELECTRIC MOTOR

CROP RESIDUE FURNACE INSTALLATION

Energy Ideas.

Project Proponent:

Killarney Curling Club

Technology:

Heat Recovery — Refrigeration

Project Location:

Box 1454
Killarney, Manitoba R0K 1G0

(204) 523-4301

Project Cost: $14,911.00

Small Scale Support: $7,500.00

Simple Payback Period:

2.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This refrigeration waste heat recovery system provides heating to the ice area space of a curling rink. Included in the project is the insulating of the 586 m² (6300 ft²) roof area with 153 mm (6 in) of glass fiber insulation (R-20) and 38 mm (1½ in) of polystyrene insulation (R-7.5), providing a total of R-27.5 value. A polyethylene vapour barrier is applied over the insulation.

The curling rink ice is kept frozen by circulating chilled brine through piping under the ice surface. The warmed returned brine is then rechilled by a refrigeration system. In a conventional ice plant, the refrigerant picks up the heat from the brine, it is compressed, and then releases the superheat and heat of condensation to the outside air by means of a condenser.

In this project installation, two Model KCC 103 Keeprite heat recovery units are used. Each unit has a maximum rating of 37.8 kW (129,000 Btu/hr). Freon is used in this system.

The two heat recovery units are located in the ice area space and are connected between the compressor and outdoor condenser. This system recovers a portion of the refrigerant superheat and heat of condensation and delivers it to the ice area space. A thermostat in this space, set at approximately 0°C (32°F), controls the fans on the heat recovery units. The fans are also interlocked with the compressor to prevent operation during the refrigeration off-cycle, when no heat is supplied to the recovery units.

It is estimated that the installation will save up to $6,000.00/year in propane heating costs providing a simple payback of 2.5 years.

The purpose of this project is to demonstrate the economics of operating this type of facility.

No. 913
Region: South Western

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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Energie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
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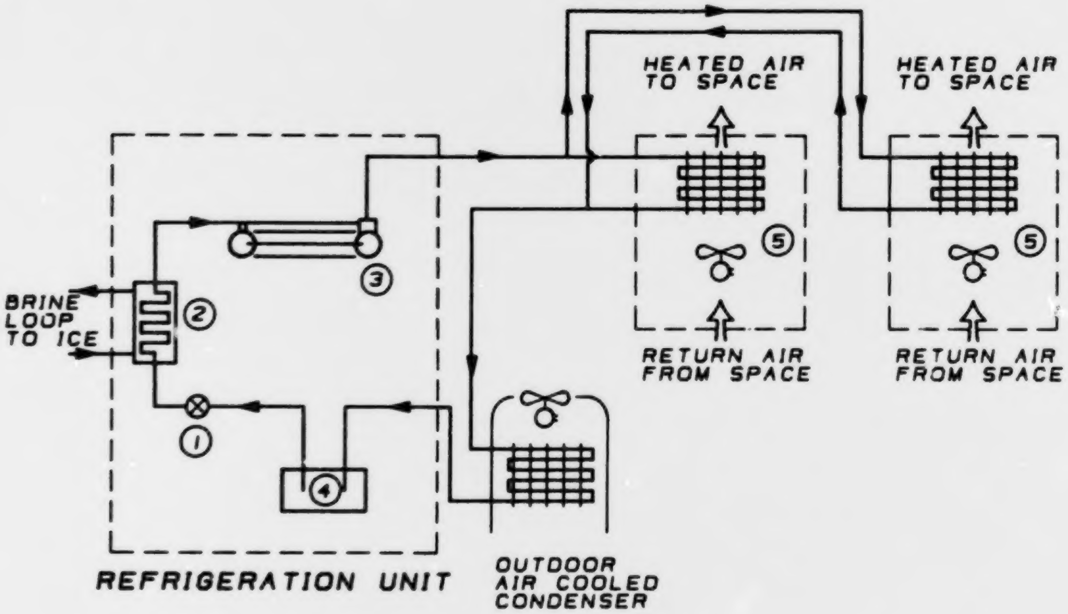
MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon. Wilson D. Parasiuk, Minister


HEATED AIR TO SPACE
HEATED AIR TO SPACE
BRINE LOOP TO ICE
②
③
⑤
⑤
RETURN AIR FROM SPACE
RETURN AIR FROM SPACE
①
④
REFRIGERATION UNIT
OUTDOOR AIR COOLED CONDENSER

LEGEND

① EXPANSION VALVE
② EVAPORATOR
③ REFRIGERANT COMPRESSOR
④ LIQUID REFRIGERANT RECEIVER
⑤ HEAT RECOVERY UNIT LOCATED IN ICE AREA SPACE

REFRIGERATION HEAT RECOVERY INSTALLATION

Energy Ideas.

Project Proponent: Westdale Community Centre

Technology: Energy Management

Project Location:

550 Dale Blvd.
Winnipeg, Manitoba R3R 1P7

(204) 895-0317

Project Cost: $9,959.50

Small Scale Support: $4,500.00

Simple Payback Period: 20 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This energy management project is designed to reduce the energy use of a non-profit community centre.

Building temperatures are maintained at 21°C (70°F) during regular occupancy hours and 13°C (55°F) during vacancy. A temperature set-back control has been installed to vary the start-up time of the warm-up period depending on the outside air temperature. This system is used for the common room and washrooms areas. Standard set-back is used for the change and dressing room areas.

In addition, the two furnaces are controlled by a two stage thermostat in the common room. The first stage controls one furnace and the second stage the other furnace when the first cannot achieve the desired room temperature. This allows one furnace to be operated as a supplementary heater, resulting in more efficient operation.

Included in this project are the partial sealing of the furnace return duct fresh air intakes and weather sealing of windows, doors and floor foundation joints.

It is estimated that this system will save $500.00/year of the $3,000.00/year heating costs, producing a simple payback of 20 years. However, a significant portion of the costs in developing the prototype temperature set-back control should not appear in the costs of production units.

The purpose of this project is to demonstrate the economics of operating this system.

No. 916
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon Wilson D. Parasiuk Minister

Energy Ideas.

Project Proponent:

Mr. B. Arnason

Technology:

Heat Pump

Project Location:

1536 McCreary Road
Winnipeg, Manitoba R3P 0M7

(204) 452-2545

Project Cost: $15,945.00

Small Scale Support: $7,500.00

Simple Payback Period:
20 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating to the 130 m² (1400 ft²) older section of a single family dwelling.

The supply well is 38.1 m (125 ft) deep and the return well 44.2 m (145 ft) deep. The two 102 mm (4 in) diameter wells are approximately 91.5 m (300 ft) apart.

A ground water heat pump takes water from the ground, extracts heat, then returns the water to the ground, usually via another well. Typically, the supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol. A. Terra II Model 035 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.47 L/s (7.5 USGPM) the rated output of this heat pump is 9.2 kW (31,400 Btu/hr) for heating and 14.2 kW (48,700 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.83 for the above conditions including a well pump requirement of 960 W per L/s (60 W per USGPM).

This system should provide a savings of 65% based on electricity. For a $1200.00/year heating cost, the saving should be approximately $780.00/year providing a simple payback of 20 years.

The purpose of this project is to demonstrate the economics of operating this type of installation.

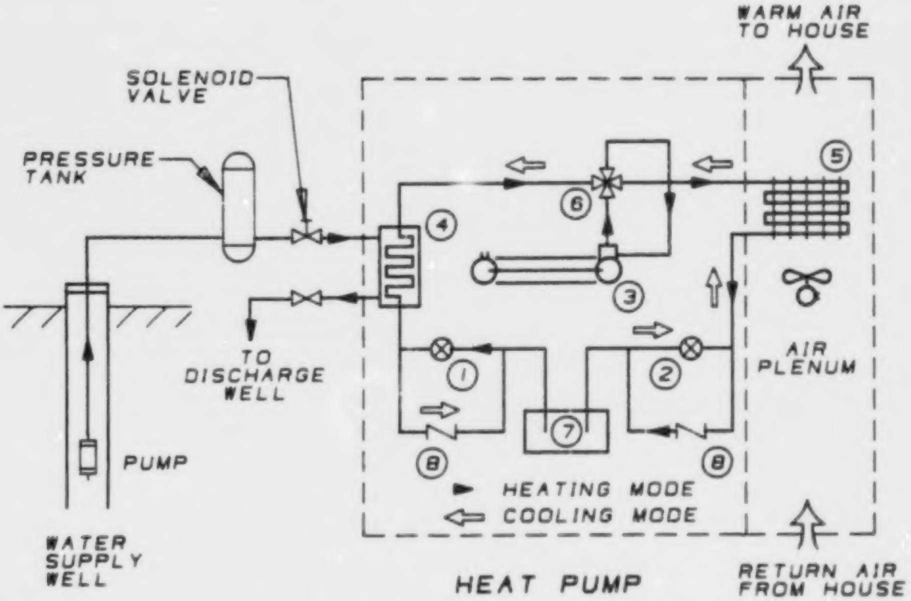
No. 918
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"


WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
⑤
④
⑥
③
AIR PLENUM
TO DISCHARGE WELL
①
②
⑦
⑧
⑧
PUMP
► HEATING MODE
⇦ COOLING MODE
WATER SUPPLY WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

TWO WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:

Sutherland Supply

Technology:

Heat Pump

Project Location:

860 St. James St.
Winnipeg, Manitoba R3G 3K2

(204) 786-8673

Project Cost: $20,545.00

Small Scale Support: $7,500.00

Simple Payback Period:

27 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides supplementary heating to a retail store.

A ground water heat pump takes water from the ground, extracts heat from it and then returns the water to the ground, usually via another well. The two 152.4 mm (6 in) diameter wells used in this project are each approximately 64 m (210 ft) deep. The supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the building. In the summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol. A. Terra II Model 027 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.38 L/s (6 USGPM) the rated output of this heat pump is 7.3 kW (25,000 Btu/hr) for heating and 9.8 kW (33,500 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.76 for the above conditions, including a well pump requirement of 960 W per L/s (60 W per USGPM).

This system should provide a savings of up to $750.00/year based on natural gas, resulting in a simple payback of 27 years.

The purpose of this project is to demonstrate the economics of operating this system.

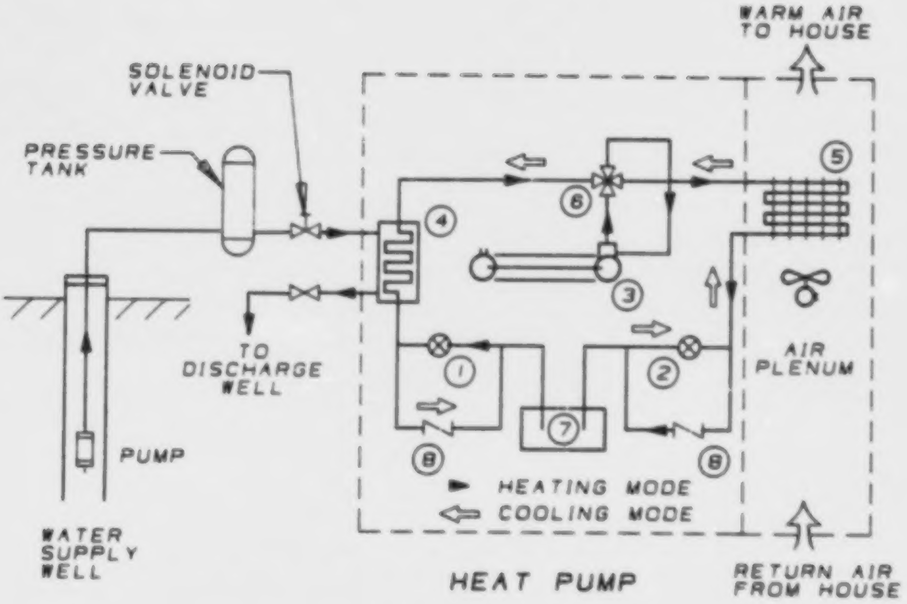
No. 919
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"


WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
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④
⑥
③
TO DISCHARGE WELL
①
②
AIR PLENUM
⑦
⑧
⑧
PUMP
HEATING MODE
COOLING MODE
WATER SUPPLY WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

TWO WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:

Mr. R. Dennis

Technology:

Heat Pump

Project Location:

General Delivery
Rosser, Manitoba R0H 1E0

(204) 467-2766

Project Cost: $11,275.00

Small Scale Support: $7,500.00

Simple Payback Period:

19 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating for a 116 m² (1250 ft²) single family dwelling.

The supply well is 25 m (82 ft) deep and the return well 20.7 m (68 ft) deep. The two 102 mm (4 in) diameter wells are approximately 38.1 m (125 ft) apart.

A ground water heat pump takes water from the ground, extracts heat from it and then returns the water to the ground, usually via another well. The supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In the summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol. A. Terra II 054 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.76 L/s (12 USGPM) the rated output of this heat pump is 14.2 kW (48,500 Btu/hr) for heating and 19.1 kW (65,000 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.78 for the above conditions including a well pump requirement of 960 W per L/s (60 W per USGPM).

This system should provide a savings of up to 65% on electricity. For a $900.00/year heating cost, the savings is approximately $590.00/year providing a simple payback of 19 years.

The purpose of this project is to demonstrate the economics of operating this system.

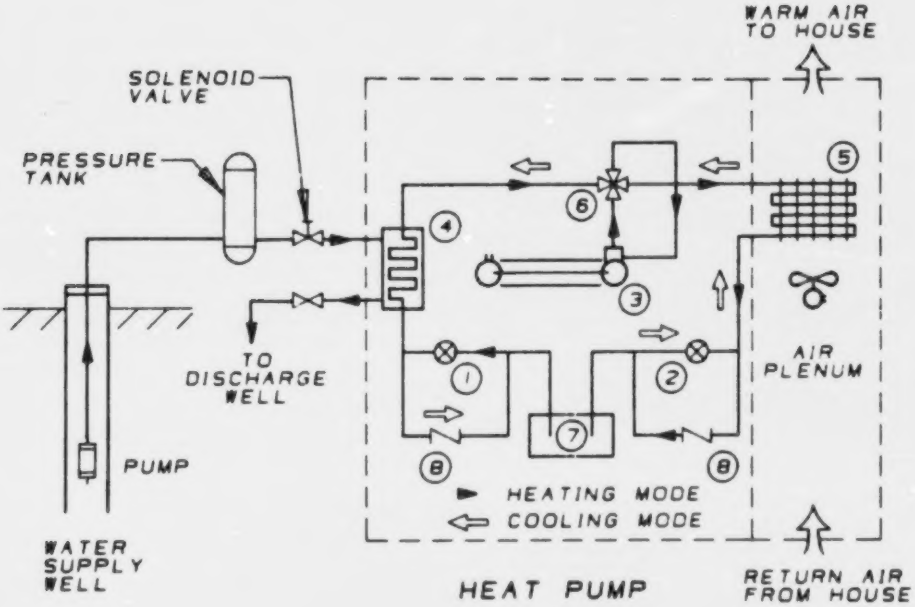
No. 921
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638 "a"


WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
⑤
⑥
④
③
TO DISCHARGE WELL
①
②
AIR PLENUM
⑦
⑧
⑧
PUMP
► HEATING MODE
⇦ COOLING MODE
WATER SUPPLY WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

TWO WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:
Mr. M. Doyle

Technology:
Heat Pump

Project Location:
Box 184
St. Adolphe, Manitoba R0A 1S0

(204) 883-2270

Project Cost: $5,730.00

Small Scale Support: $3,690.00

Simple Payback Period:
10 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground source heat pump installation provides heating for a 186 m^2 (2000 ft^2) single family dwelling. Heat is extracted from the earth in this system.

The recirculating ground loop consists of copper tubing arranged in a parallel grid network buried 2.4 m (8 ft) in the ground. The grid covers an area of 195 m^2 (2100 ft^2) with the tubes approximately 1.8 m (6 ft) apart. An alcohol-water solution is used in the ground loop.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol-A-Terra II model 027 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.38 L/s (6 USGPM) the rated output of this heat pump is 7.3 kW (25,000 Btu/hr) for heating and 9.8 kW (33,500 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.76 for the above conditions including a fluid pump requirement of 960 W per L/s (60 W per USGPM).

However, the operating characteristics of this installation may be different depending on the performance of the ground loop. It is estimated that the $1100.00/year heating costs should be reduced to $500.00/year. This would provide a savings of $600.00/year resulting in a simple payback of 10 years.

The purpose of this project is to demonstrate the operation and economics of this system.

No. 923
Region: South Eastern

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

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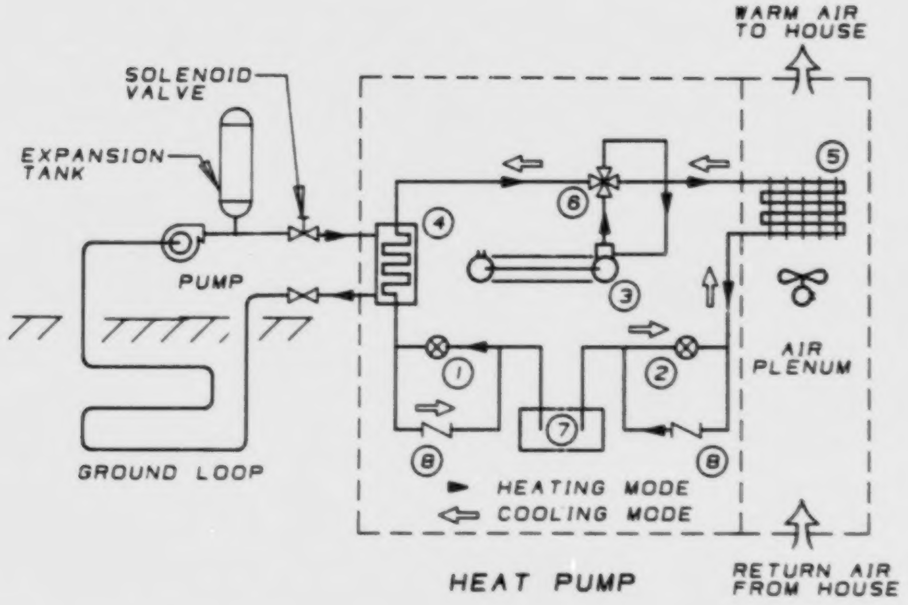

WARM AIR TO HOUSE
SOLENOID VALVE
EXPANSION TANK
PUMP
GROUND LOOP
④
⑤
⑥
③
①
②
⑦
⑧
⑧
AIR PLENUM
► HEATING MODE
⇦ COOLING MODE
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

EARTH SOURCE
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent: Mr. M. Futros	**Technology:** Heat Pump
Project Location: Box 124 St. Laurent, Manitoba R0C 2S6	(204) 646-2512
Project Cost: $13,957.00 **Small Scale Support:** $7,500.00	**Simple Payback Period:** 14.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating for a 279 m² (3000 ft²) single family dwelling.

A ground water heat pump takes water from the ground, extracts heat from it and then returns the water to the ground, usually via another well. However, for this installation a single well is used. The well is 203 mm (8 in) in diameter and 32 m (105 ft) deep with the water level 2.6 m (8.5 ft) below ground. Supply water is taken from a depth of 10.7 m (35 ft) and returned to the well at a depth of 21.3 m (70 ft). The supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In the summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol. A. Terra II Model 064 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.88 L/s (14 USGPM) the rated output of this heat pump is 16.3 kW (55,600 Btu/hr) for heating and 21.6 kW (73,800 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.83 for the above conditions including a well pump requirement of 960 W per L/s (60 W per USGPM).

This system should provide a savings of 65% based on electricity. For a $1500.00/year heating cost, the savings would be approximately $975.00/year providing a simple payback of 14.5 years.

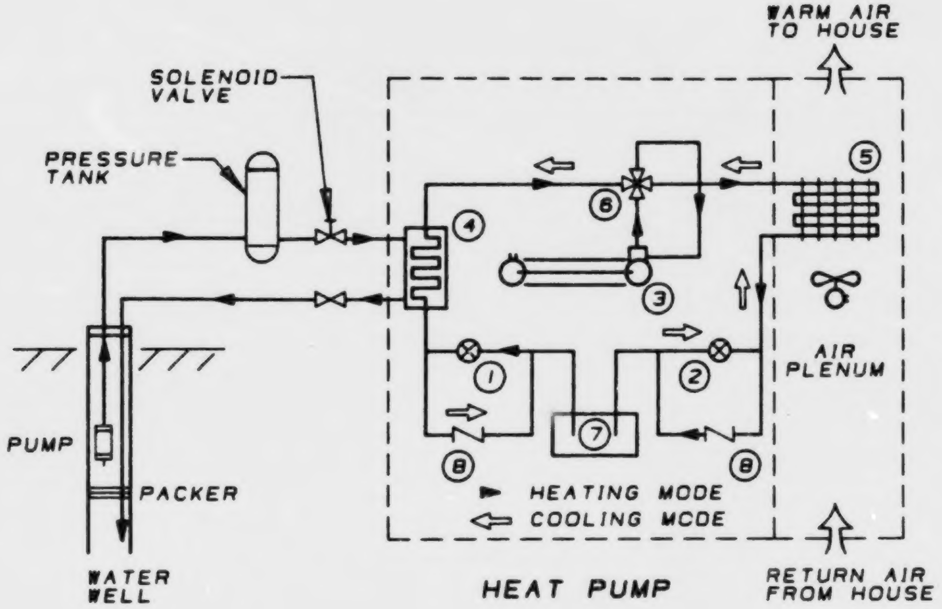
The purpose of this project is to demonstrate the economics of operating this system.

No. 924
Region: East Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon Wilson D. Parasiuk, Minister


WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
5
4
6
3
AIR PLENUM
1
2
7
8
8
PUMP
PACKER
HEATING MODE
COOLING MODE
WATER WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

SINGLE WELL GROUND WATER HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:
Mr. Al Christie

Technology:
Heat Recovery

Project Location:
National Washettes Ltd.
629 Beecher Avenue
Winnipeg, Manitoba R2P 0G5

(204) 334-1515

Project Cost: $10,150.00

Small Scale Support: $7,500.00

Simple Payback Period:
13 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This dryer waste heat recovery system provides preheating of the cold water supply to the gas water heater of a commercial laundromat.

Air to water heat exchangers constructed of 31.8 mm (1¼ in) copper tubing are located on top of each of the eight gas clothes dryers. They are connected in series with nine passes of tubing for each dryer. The cold inlet water is preheated in the heat exchangers and then piped into the water preheat tank. The water temperature in the preheat tank is then raised to 49°C (120°F) by circulating the water through a gas fired water heater. The circulating pump is on thermostatic control. Thermometers measure the inlet and outlet temperatures of the water. The heat exchangers are covered with glass fibre insulation.

In addition, two ceiling fans are mounted behind the upper dryer enclosure to force the accumulated warm air into the main building area. These fans are operated only during the heating season.

It is estimated that this installation will save $800.00/year of the $4,800.00/year natural gas energy costs. Based on the above the simple payback should be 13 years.

The purpose of this project is to demonstrate the economics of operating this system.

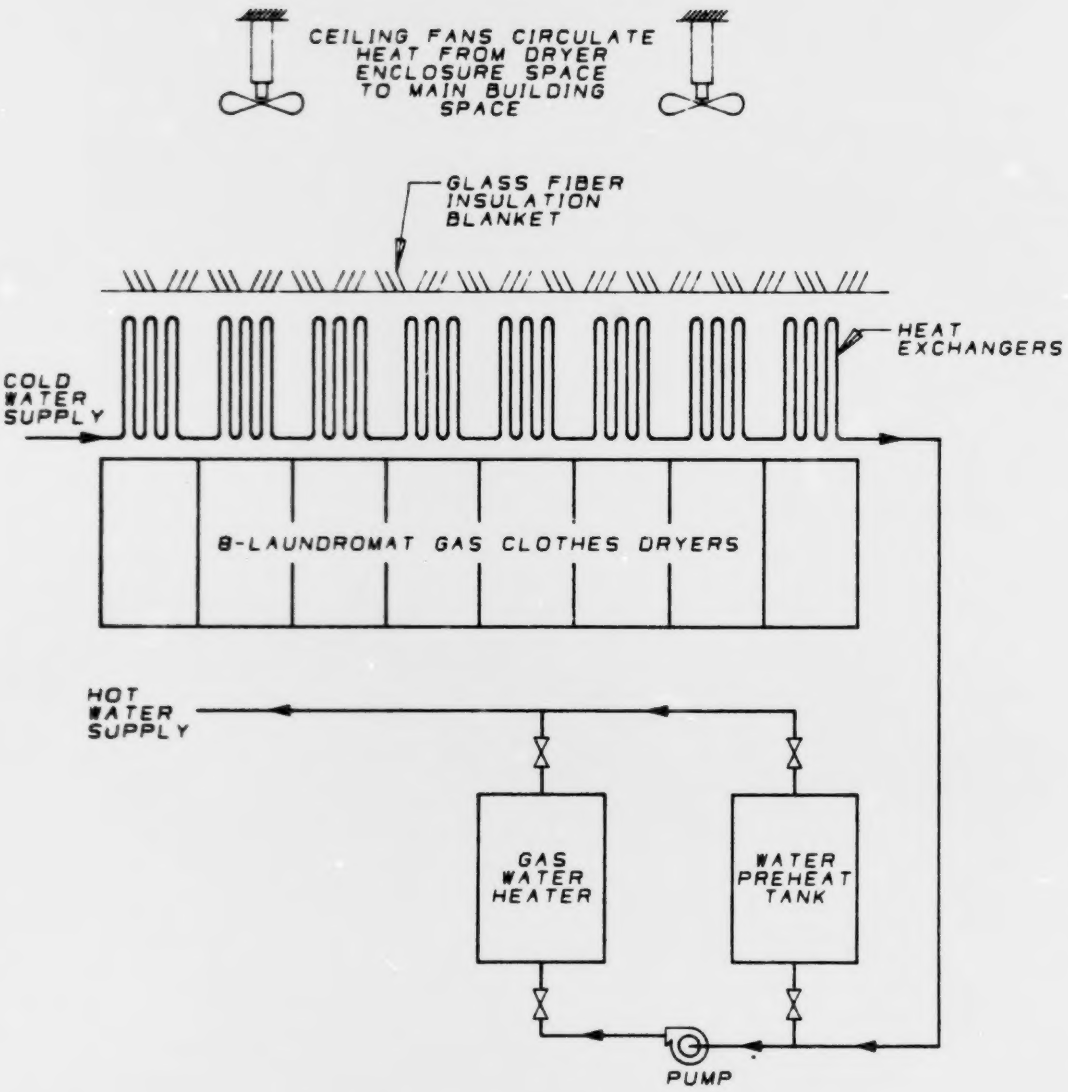
No. 928
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy Mines and Resources Canada
Energie Mines et Ressources Canada

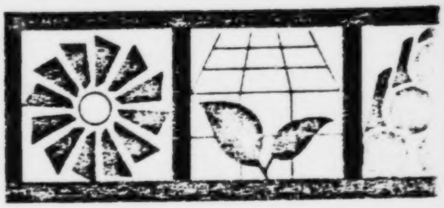
Manitoba
Energy and Mines

AG-638"a"


CEILING FANS CIRCULATE HEAT FROM DRYER ENCLOSURE SPACE TO MAIN BUILDING SPACE
GLASS FIBER INSULATION BLANKET
HEAT EXCHANGERS
COLD WATER SUPPLY
8-LAUNDROMAT GAS CLOTHES DRYERS
HOT WATER SUPPLY
GAS WATER HEATER
WATER PREHEAT TANK
PUMP

LAUNDROMAT DRYER WASTE HEAT RECOVERY INSTALLATION

Energy Ideas.



Project Proponent:

Notre Dame Recreation Centre

Technology:

Heat Recovery — Refrigeration

Project Location:

Notre Dame de Lourdes,
Manitoba R0G 1M0

(204) 248-2051

Project Cost: $13,895.00

Small Scale Support: $7,500.00

Simple Payback Period:

3.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This refrigeration heat recovery system provides the primary hot water heating requirements for an arena. Hot water is used for ice surfacing, snow melting, and kitchen and shower facilities.

The arena ice is kept frozen by circulating chilled brine through piping under the ice surface. The warmed return brine is then rechilled by a refrigeration system. In a conventional ice plant, the refrigerant picks up the heat from the brine, is compressed, and then releases the superheat and heat of condensation to the outside air by means of a condenser.

In this installation, the heat is used to make hot water. Two Therma-Stor II heat recovery units are used; one for each refrigeration system. Each Therma-Stor II is connected in series between the compressor and condenser with a controlled refrigerant by-pass. This allows the unit to operate at full capacity without overloading the compressors. It is designed to recover a portion of the refrigerant heat for water heating, and has a maximum rating of 29.3 kW (100,000 Btu/hr). The hot water is stored for use when required or transferred to holding tanks for extra storage capacity.

It is estimated that this system will save up to $4,000.00 per year in electrical energy consumption and demand charges. This should result in a simple payback of 3.5 years.

The purpose of this project is to demonstrate the economics of operating this system.

No 929
Region: South Central

MG-13141

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada

Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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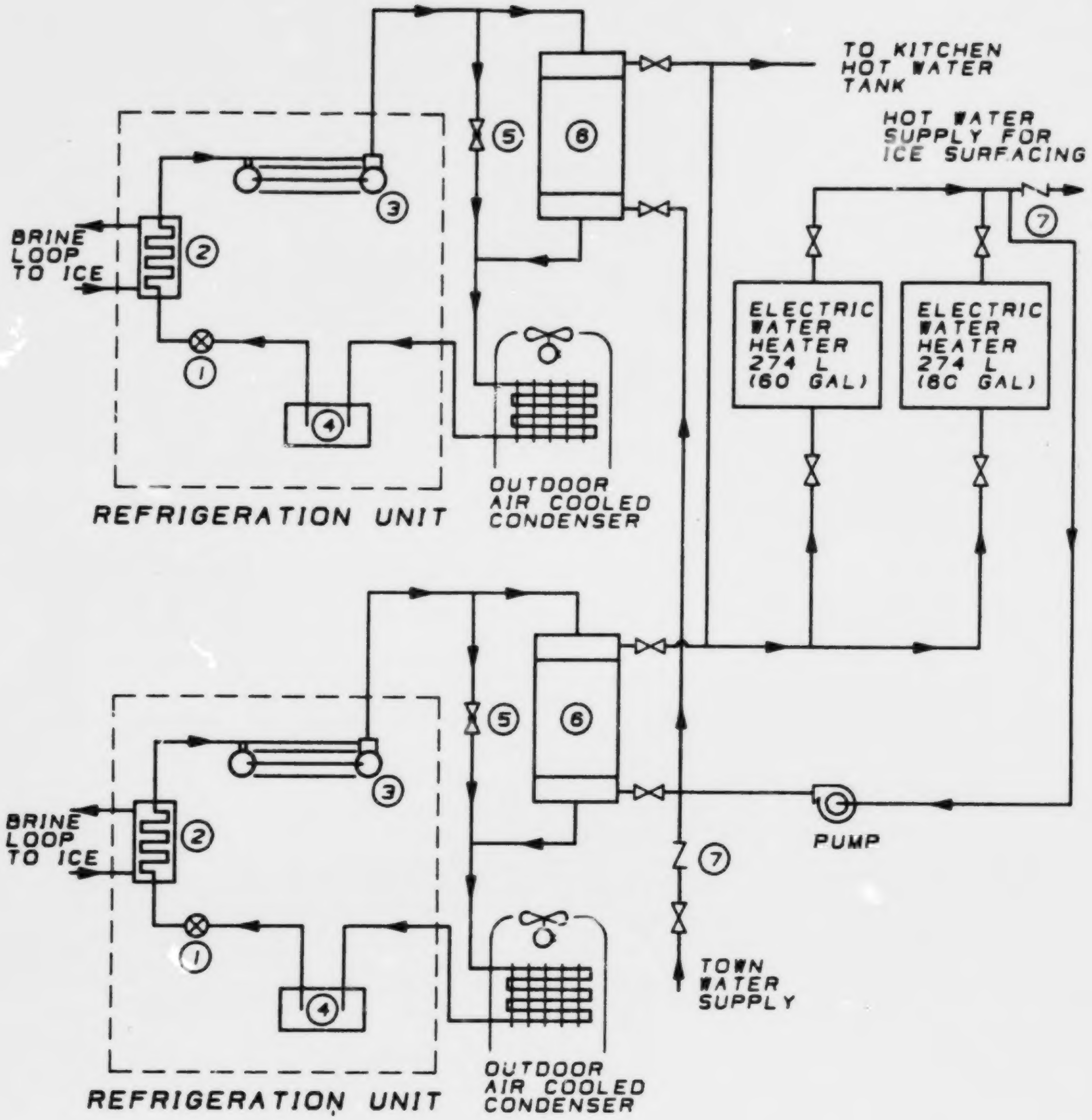
TO KITCHEN HOT WATER TANK
HOT WATER SUPPLY FOR ICE SURFACING
5
6
3
2
1
4
7
BRINE LOOP TO ICE
ELECTRIC WATER HEATER 274 L (60 GAL)
ELECTRIC WATER HEATER 274 L (60 GAL)
OUTDOOR AIR COOLED CONDENSER
REFRIGERATION UNIT
5
6
3
2
1
4
7
BRINE LOOP TO ICE
PUMP
TOWN WATER SUPPLY
OUTDOOR AIR COOLED CONDENSER
REFRIGERATION UNIT

LEGEND

① EXPANSION VALVE
② EVAPORATOR
③ REFRIGERANT COMPRESSOR
④ LIQUID REFRIGERANT RECEIVER
⑤ REFRIGERANT BY-PASS VALVE
⑥ THERMA-STOR II HEAT RECOVERY UNIT
⑦ CHECK VALVE

REFRIGERATION HEAT RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:
Winkler Arena

Technology:
Heat Recovery — Refrigeration

Project Location:

Box 1055
Winkler, Manitoba R0G 2X0

(204) 325-8333

Project Cost: $7,860.00

Small Scale Support: $5,895.00

Simple Payback Period:
3 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This refrigeration heat recovery system provides the primary hot water heating requirements for an arena. Hot water is used for ice surfacing and snow melting. The three existing hot water heaters are used as a backup to upgrade the water temperature.

The arena ice is kept frozen by circulating chilled brine through piping under the ice surface. The warmed return brine is then rechilled by a refrigeration system. In a conventional ice plant, the ammonia refrigerant picks up the heat from the brine, is compressed, and then releases the superheat and heat of condensation to the outside air by means of a condenser.

In this installation, the heat is used to produce hot water. A Therma-Stor II heat recovery unit is connected in series between the compressor and condenser with a controlled refrigerant bypass. This allows the unit to operate at full capacity without overloading the compressors. It is designed to recover a portion of the refrigerant heat for water heating, and has a maximum rating of 29.3 kW (100,000 Btu/hr) The three existing electric hot water heaters are connected in series and used to upgrade the temperature of the water from the Therma-Stor II unit.

It is estimated that this system will save up to $3,000.00/year in electrical energy consumption and demand charges. This should result in a simple payback of three years.

The purpose of the project is to demonstrate the economics of operating this type of system.

No. 930
Region: South Central

MG 12230

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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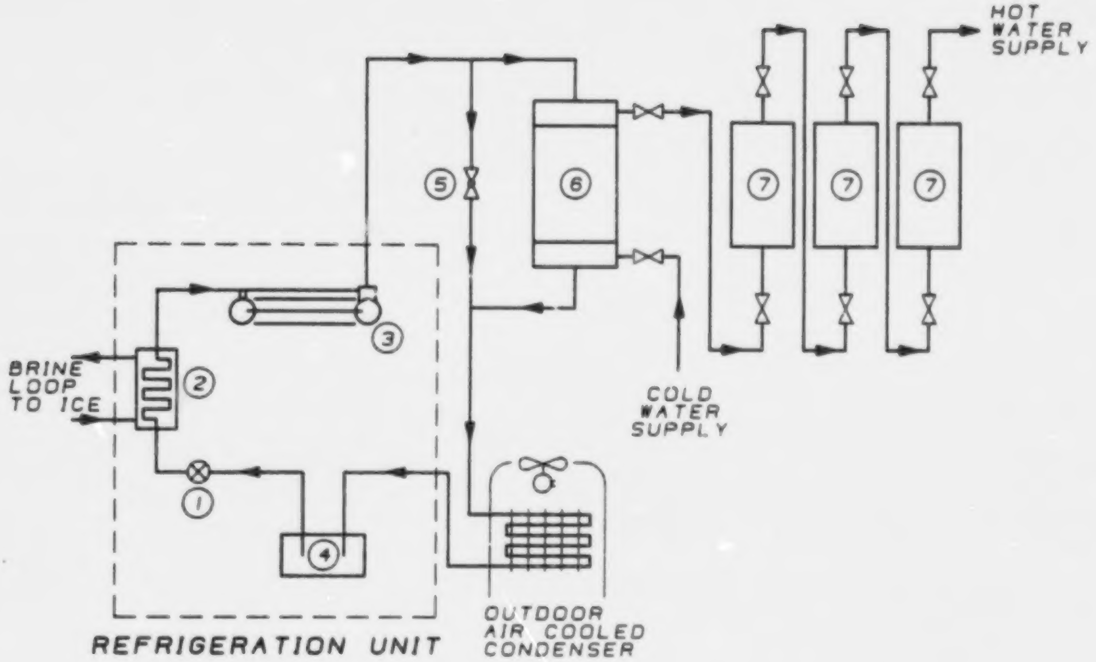

HOT WATER SUPPLY
⑤
⑥
⑦
⑦
⑦
③
BRINE LOOP TO ICE
②
COLD WATER SUPPLY
①
④
REFRIGERATION UNIT
OUTDOOR AIR COOLED CONDENSER

LEGEND

① EXPANSION VALVE
② EVAPORATOR
③ REFRIGERANT COMPRESSOR
④ LIQUID REFRIGERANT RECEIVER
⑤ REFRIGERANT BY-PASS VALVE
⑥ THERMA-STOR II HEAT RECOVERY UNIT
⑦ ELECTRIC WATER HEATER, 455 L (100 GAL.)

REFRIGERATION HEAT RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:
Mr. Daniel Hofer

Technology:
Heat Recovery — Grey Water

Project Location:
James Valley Colony
Elie, Manitoba R0H 0H0

(204) 352-2827

Project Cost: $1,955.00
Small Scale Support: $1,447.00

Simple Payback Period:
4 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This grey water heat recovery system provides preheating of the domestic hot water supply of a communal laundry.

The counter-flow heat exchanger consists of a 610 x 2134 x 457 mm (24 x 84 x 18 in) rectangular stainless steel holding tank divided into 12 sections by 11 off-set baffle plates. There are three passes of 38 mm (1½ in) copper tubing in each section, all interconnected in series.

The hot grey water is drained into the holding tank, where it passes in series through each successive section and before draining at the opposite end. The fresh cold water supply passes through the copper tubing and is preheated before passing to the electric water heater.

Fresh water on the high pressure side reduces the chances of cross-contamination of the two streams due to leakage.

It is estimated that this system will save 25% of the $2,100.00/year laundry hot water heating costs. Based on the above, the annual savings is $525.00, providing a simple payback of four years.

The purpose of this project is to demonstrate the economics of operating this system.

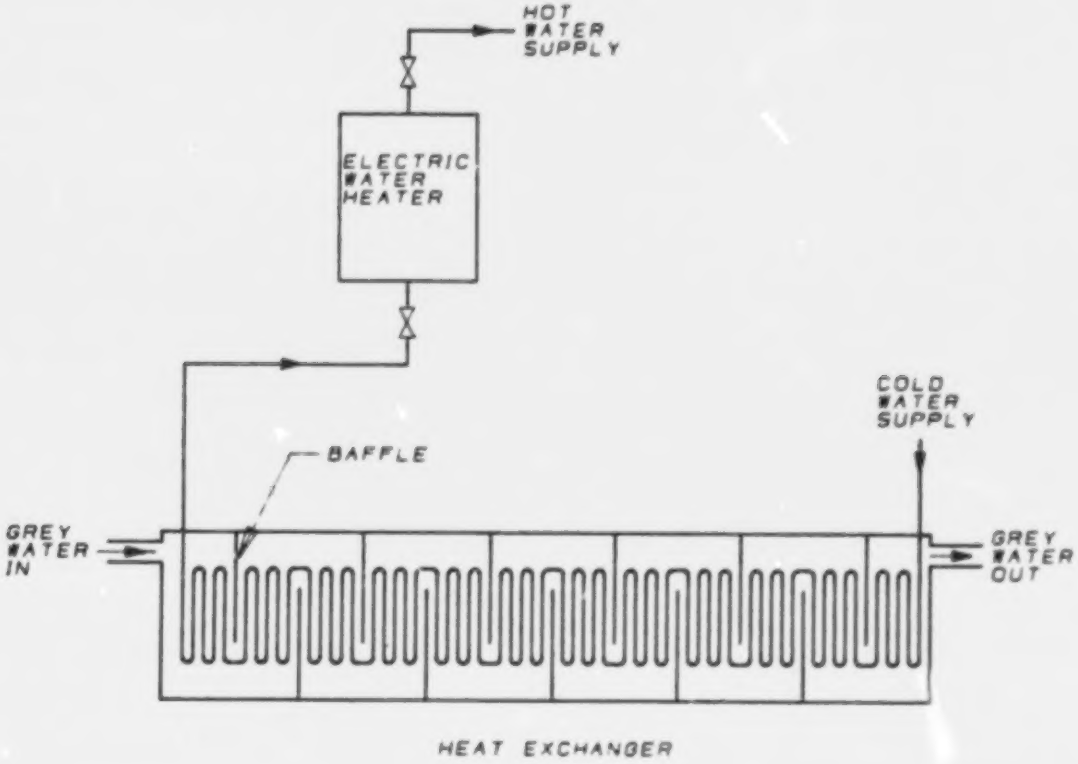
No. 931
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638 "a"


HOT WATER SUPPLY
ELECTRIC WATER HEATER
COLD WATER SUPPLY
BAFFLE
GREY WATER IN
GREY WATER OUT
HEAT EXCHANGER

GREY WATER
HEAT RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:

Birtle District Community Centre

Technology:

Heat Recovery — Refrigeration

Project Location:

Box 341
Birtle, Manitoba R0M 0C0

(204) 842-3761

Project Cost: $11,045.00

Small Scale Support: $7,500.00

Simple Payback Period:

9 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This refrigeration heat recovery system provides the primary hot water heating requirements for arena ice surfacing. An electric hot water heater is used as a backup.

The arena ice is kept frozen by circulating chilled brine through piping under the ice surface. The warmed return brine is then rechilled by a refrigeration system. In a conventional ice plant, the refrigerant picks up the heat from the brine, is compressed, and then releases the superheat and heat of condensation to the outside air by means of a condenser.

In this installation, a model EC600 Egosaver heat recovery unit is connected in the refrigerant hot gas line between the compressor and the condenser. The Egosaver consists of a double-walled refrigerant to water heat exchanger, a circulating pump and a thermostatic control. It is designed to recover up to 25% of the refrigerant heat which is normally dumped to the atmosphere by the condensers.

The hot water is stored in a 2727 L (600 Imp. gal.) tank. This system should provide heating of the water up to 55°C (130°F).

The arena uses approximately 600,000 L (132,000 Imp. gal.) of hot water annually for ice surfacing, requiring approximately 43,960 kWh (1.5 x 10^6 Btu) of energy. This system should provide 90% of the above hot water requirements, resulting in an annual savings of approximately $1200.00 and a simple payback of 9 years.

The purpose of this project is to demonstrate the economics of operating this type of facility.

No. 932
Region: South Western

MG-13140

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

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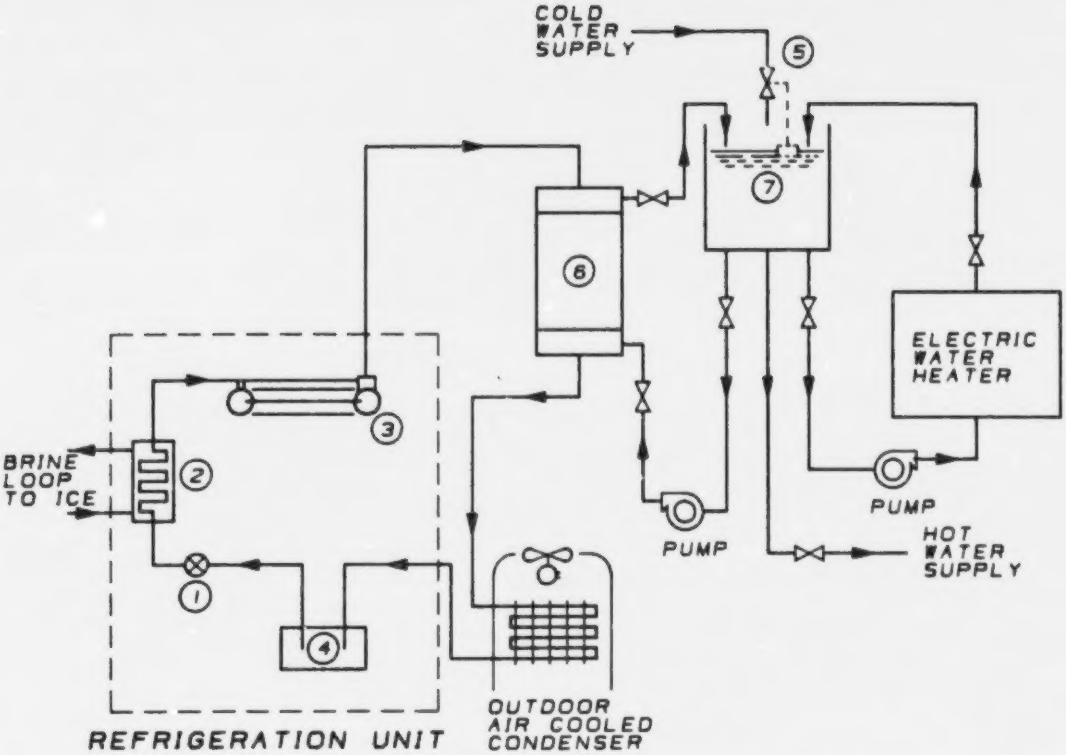
COLD WATER SUPPLY
⑤
⑦
⑥
③
②
BRINE LOOP TO ICE
①
④
REFRIGERATION UNIT
OUTDOOR AIR COOLED CONDENSER
PUMP
PUMP
ELECTRIC WATER HEATER
HOT WATER SUPPLY

LEGEND

① EXPANSION VALVE
② EVAPORATOR
③ REFRIGERANT COMPRESSOR
④ LIQUID REFRIGERANT RECEIVER
⑤ FLOAT VALVE
⑥ EGOSAVER EC 600 HEAT RECOVERY UNIT
⑦ HOT WATER STORAGE TANK, 3030 L (600 GAL)

REFRIGERATION HEAT
RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:

Mr. Clarence Baker

Technology:

Heat Recovery — Grain Dryer

Project Location:

Box 291
Beausejour, Manitoba R0E 0C0

(204) 268-1070

Project Cost: $8,628.00

Small Scale Support: $6,000.00

Simple Payback Period:

10 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This system recovers and recycles heat to a continuous heated-air grain dryer. Manitoba Agriculture is assisting in the design and monitoring of the operation.

Normally , for this type of dryer, the grain travels vertically downward in a single pass through a heated air section and then through a cooling section. The hot exhaust gas is released to the atmosphere.

In the project operation, approximately 40% or 4010 L/s (8500 ft^3/min) of the exhaust gases are diverted through a heat exchanger, preheating the incoming air to the dryer. The cross-flow heat exchanger is constructed of plywood and 127 mm (5 in) diameter sheet metal ducting. A total of 150 — 6.1 m (20 ft) long ducts are used. The fresh air flows through the inside of the ducts and the exhaust air over the outside surface perpendicular to the ducts.

The proponent expects to recover 20% of his $4,500.00 annual propane costs, providing a simple payback of 10 years.

The purpose of this project is to demonstrate the economics of operating this system.

No. 933
Region: South Eastern

MG 12400

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada

Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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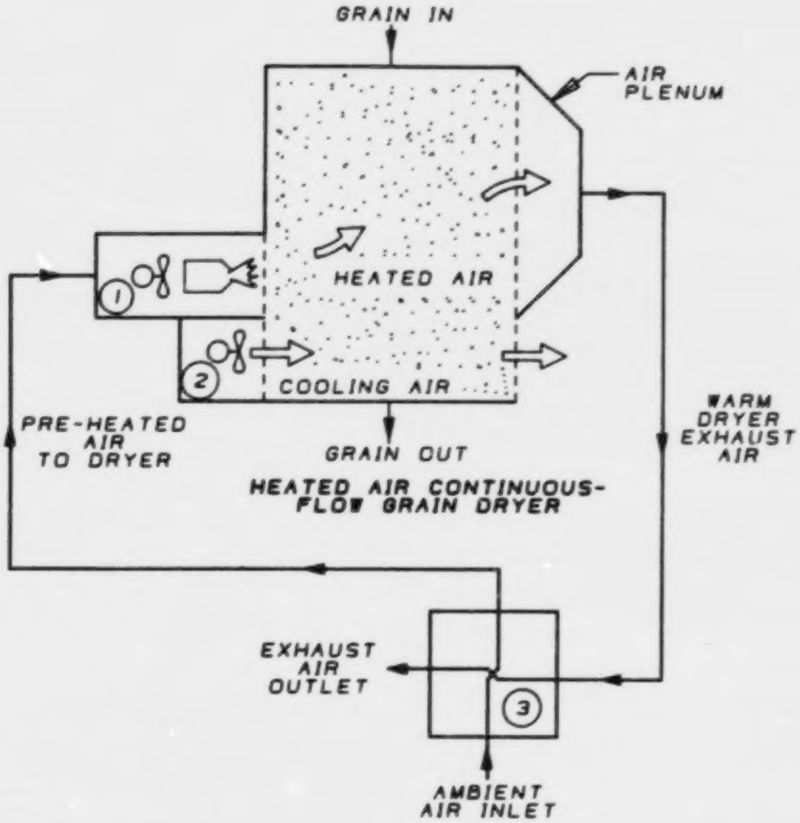

GRAIN IN
AIR PLENUM
HEATED AIR
COOLING AIR
1
2
PRE-HEATED AIR TO DRYER
GRAIN OUT
WARM DRYER EXHAUST AIR
HEATED AIR CONTINUOUS-FLOW GRAIN DRYER
EXHAUST AIR OUTLET
3
AMBIENT AIR INLET

LEGEND

① PROPANE BURNER
② COOLING FAN
③ CROSS-FLOW AIR TO AIR HEAT EXCHANGER

GRAIN DRYER HEAT RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:

Grand Rapids Indian Band

Technology:

Heat Recovery — Grey Water Dryer Exhaust

Project Location:

Grand Rapids, Manitoba R0C 1E0

(204) 639-2485

Project Cost: $10,943.00

Small Scale Support: $7,150.00

Simple Payback Period:

10 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This grey water and dryer heat recovery system provides preheating of the cold water supply to the electric water heaters of a laundromat facility.

In this installation, there are two stages of heat recovery; grey water and dryer exhaust. In the first stage, the laundry grey water flows into an insulated underground septic tank used for the grey water only. The grey water is then pumped out of the septic tank through a water to water counterflow heat exchanger and into the septic field. Fresh water from the well is preheated in the heat exchanger and then flows into the dryer heat recovery system.

The dryer heat recovery system consists of a duct, filter and a finned tube air to water heat exchanger. The exhausts from six dryers are connected to the common duct. Exhaust air from the dryers flows through the duct, filter, heat exchanger and then to the outdoors. The fresh water, preheated in the grey water heat recovery stage, is further preheated in the air to water heat exchanger and then flows into the electric water heaters.

It is estimated that this system will save up to 1.31 x 10^5 MJ year (1.24 x 10^8 Btu year) in energy. Based on electrical energy costs, the savings should be approximately $1,090 year providing a simple payback of 10 years.

The purpose of this project is to demonstrate the economics of operating this system.

MG [illegible]

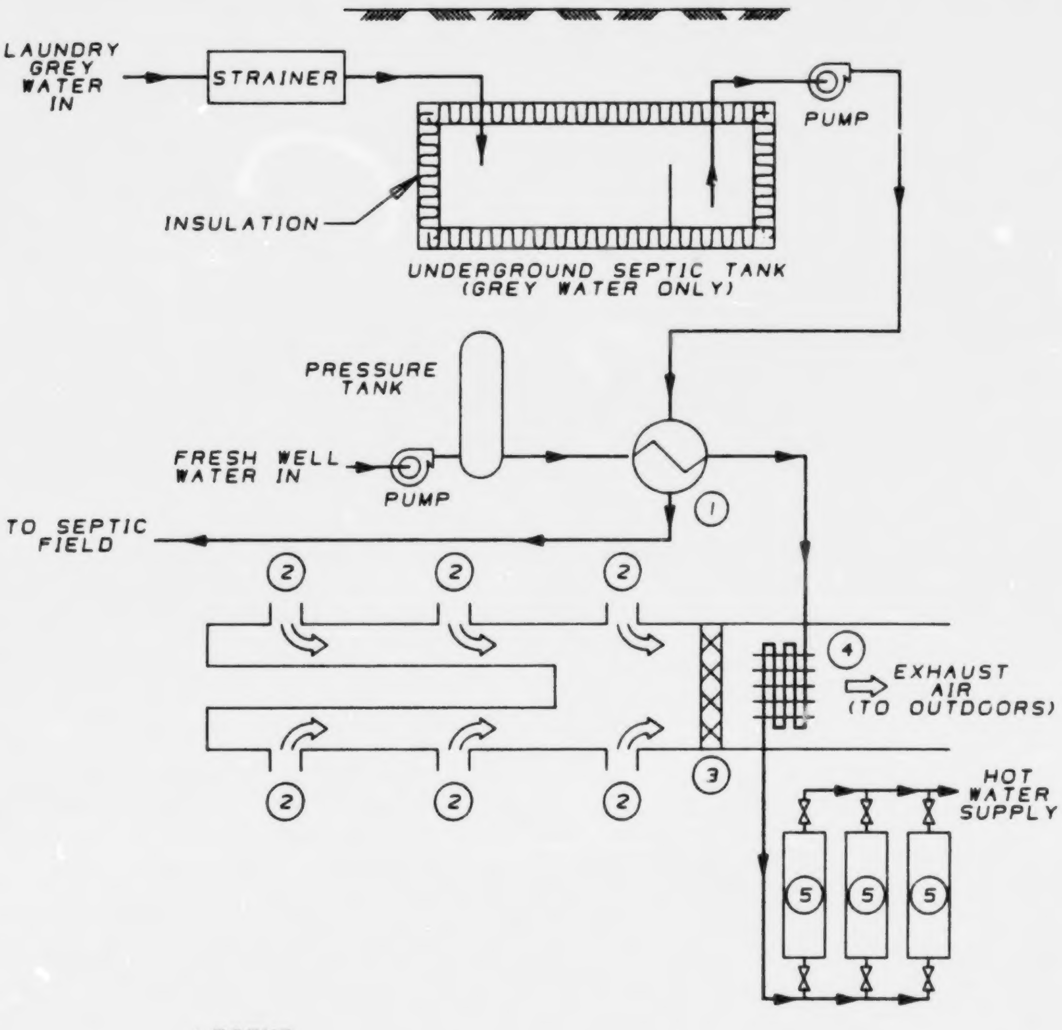
No. 934
Region: Northern

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"


LAUNDRY GREY WATER IN
STRAINER
PUMP
INSULATION
UNDERGROUND SEPTIC TANK (GREY WATER ONLY)
PRESSURE TANK
FRESH WELL WATER IN
PUMP
1
TO SEPTIC FIELD
2
2
2
4
EXHAUST AIR (TO OUTDOORS)
2
2
2
3
HOT WATER SUPPLY
5
5
5

LEGEND

① COUNTER-FLOW WATER-TO-WATER HEAT EXCHANGER

② EXHAUST AIR FROM DRYER

③ AIR FILTER

④ FINNED-TUBE AIR-TO-WATER HEAT EXCHANGER

⑤ 454.5 L (100 IMP GAL), 36 kW ELECTRIC WATER HEATER

LAUNDROMAT GREY WATER AND DRYER HEAT RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:

Mr. Norman Dashevsky

Technology:

Energy Conservation — Grain Dryer

Project Location:

1324 Chancellor Dr.
Winnipeg, Manitoba R3T 4J3

(204) 269-7086

Project Cost: $11,564.00

Small Scale Support: $7,500.00

Simple Payback Period:

7.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This natural air grain drying system is designed to reduce the electrical energy requirements for grain drying. The system is installed in a 3000 bushel steel grain bin.

Unlike the common perforated floor natural air drying bins, this system uses a 457 mm (18 in) diameter vertical perforated duct located centrally in the radial axis of the round steel bin. Two butterfly valves adjust the effective height of the duct according to the height of the grain in the bin. Thirteen 203 mm (8 in) relief ducts are located around the periphery inside the circular bin.

A vane-axial fan supplies natural air to the central vertical duct. This air moves radially outward through the grain to the relief ducts and then flows upward and out the top of the bin vent.

The Agricultural Engineering Department of the University of Manitoba is monitoring the project.

It is estimated that this installation will use approximately ¼ of the electrical energy normally used by natural air perforated floor systems. Assuming an annual energy usage of 6000 kWh, this system should save 4500 kWh per year based on the above. At present day electrical energy costs the savings should be $135.00/year. The proponent has estimated that a typical incremental cost of installing this system over a conventional system would be approximately $1000.00, resulting in a simple payback of 7.5 years.

The purpose of this project is to demonstrate the operating characteristics and economics of this installation.

No. 935
Region: South Central

MG-12139

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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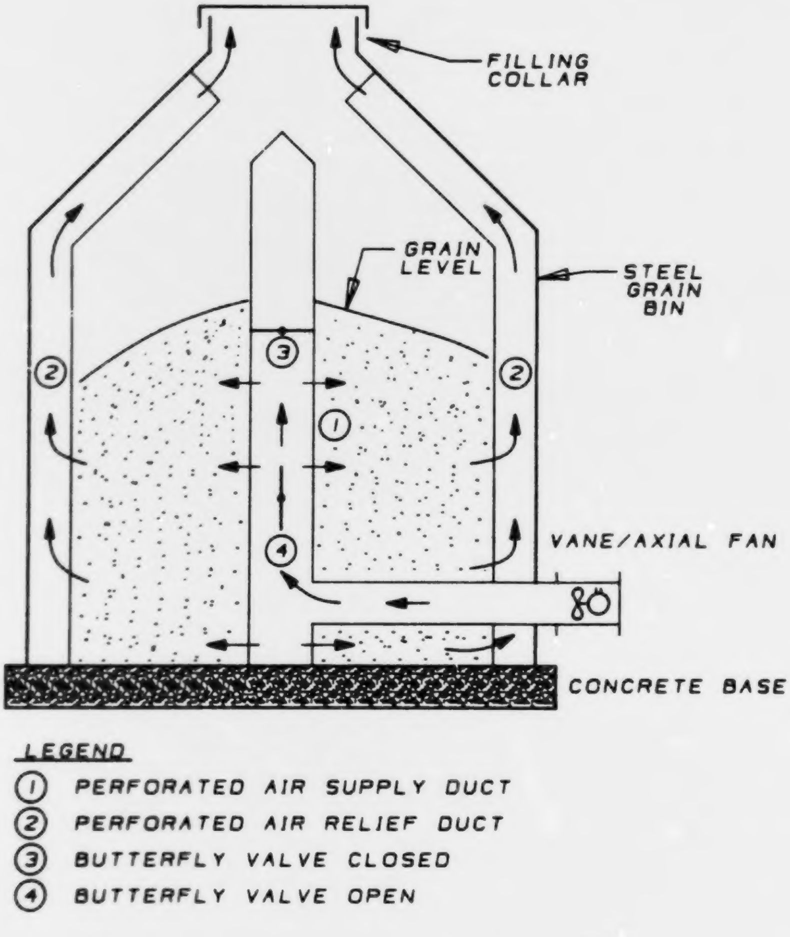

FILLING COLLAR
GRAIN LEVEL
STEEL GRAIN BIN
VANE/AXIAL FAN
CONCRETE BASE
③
②
①
④
LEGEND
① PERFORATED AIR SUPPLY DUCT
② PERFORATED AIR RELIEF DUCT
③ BUTTERFLY VALVE CLOSED
④ BUTTERFLY VALVE OPEN

NATURAL AIR GRAIN DRYING INSTALLATION

Energy Ideas.

Project Proponent:

Mr. R.A. Fisher

Technology:

Solar Greenhouse

Project Location:

R.R. #5, Site 10, Box 18
Dauphin, Manitoba R7N 2T8

(204) 638-6158

Project Cost: $8,528.00

Small Scale Support: $3,500.00

Simple Payback Period:

39 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This 1.8 x 6.1 m (6 x 20 ft) solar greenhouse, attached to the south wall of a single family dwelling, provides a conducive environment for plant growth and supplementary heating to the house.

The south wall of the greenhouse is glazed with double pane window panels, covering 10 m² (108 ft²) at a 60° angle to the horizontal and 5 m² (54 ft²) at 90°. All other areas including the perimeter are insulated.

Thermal storage is provided by concrete blocks below the greenhouse floor.

A blower circulates air from the greenhouse to the heat storage space containing the concrete blocks. A thermostatically controlled fan circulates the air from the greenhouse to the house.

One feature of this greenhouse is the automatic, photo-electrically controlled insulated shutter system installed over the sloped glass panels. Shutters for the vertical glass panels are manually operated.

The applicant has estimated that this installation would provide a net contribution to home heating of 18 GJ/year (17,000,000 Btu/year) of energy if a minimum greenhouse temperature of 13°C (55°F) were maintained for plant growth year round. Since the greenhouse will not be used for plants in December and January, then the net contribution to the home should be greater, approximately 26 GJ/year (24,600,000 Btu/year).

At present costs, the annual energy saving should be $220.00, providing a simple payback of 39 years.

The purpose of this project is to demonstrate the economics of operating this type of installation.

MG 12210

No. 937
Region: West Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"

Energy Ideas.

Project Proponent: Mr. Richard Loeb	Technology: Solar Greenhouse
Project Location: R.R. #1 Anola, Manitoba R0E 0A0	(204) 268-1189
Project Cost: $7,949.00 Small Scale Support: $3,900.00	Simple Payback Period: 26.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This 3.7 x 6.1 m (12 x 20 ft) solar greenhouse provides a conducive environment for year round plant growth. The sun is the primary source of heat and light for this installation.

The greenhouse is an "A" frame construction with the wall and roof areas insulated with 305 mm (12 in) nominal glass fibre providing an R-40 insulating value. The concrete slab perimeter is insulated with 76 mm (3 in) rigid foam providing an R-15 insulation value. The rock storage is also insulated from the ground with 76 mm (3 in) rigid foam. The 10 m^2 (107 ft^2) glazed area faces south and 50° to the horizontal. Glazing consists of a double layer of fiberglass reinforced plastic. Insulating shutters made from wood and 38 mm (1½ in) rigid foam insulation help retain the heat at night and during cloudy periods.

Heat storage is provided by a 5.4 m^3 (7 cu. yd.) concrete slab floor plus 3.8 m^3 (5 cu. yd.) of rock storage beneath the floor. A blower circulates air from the greenhouse through the rock storage and back into the space. Extra heat storage is provided by water filled drums.

One feature of this greenhouse is the reflective surface on the upper shutters. In the open position, these shutters reflect sunlight onto the glazing, concentrating a greater portion of solar energy through the fixed glazed area than directly possible.

The estimated heating costs for this greenhouse are $75.00/year. The estimated savings over conventional greenhouse designs are $300.00/year, providing a simple payback of 26.5 years.

The purpose of this project is to demonstrate the economics of operating this system.

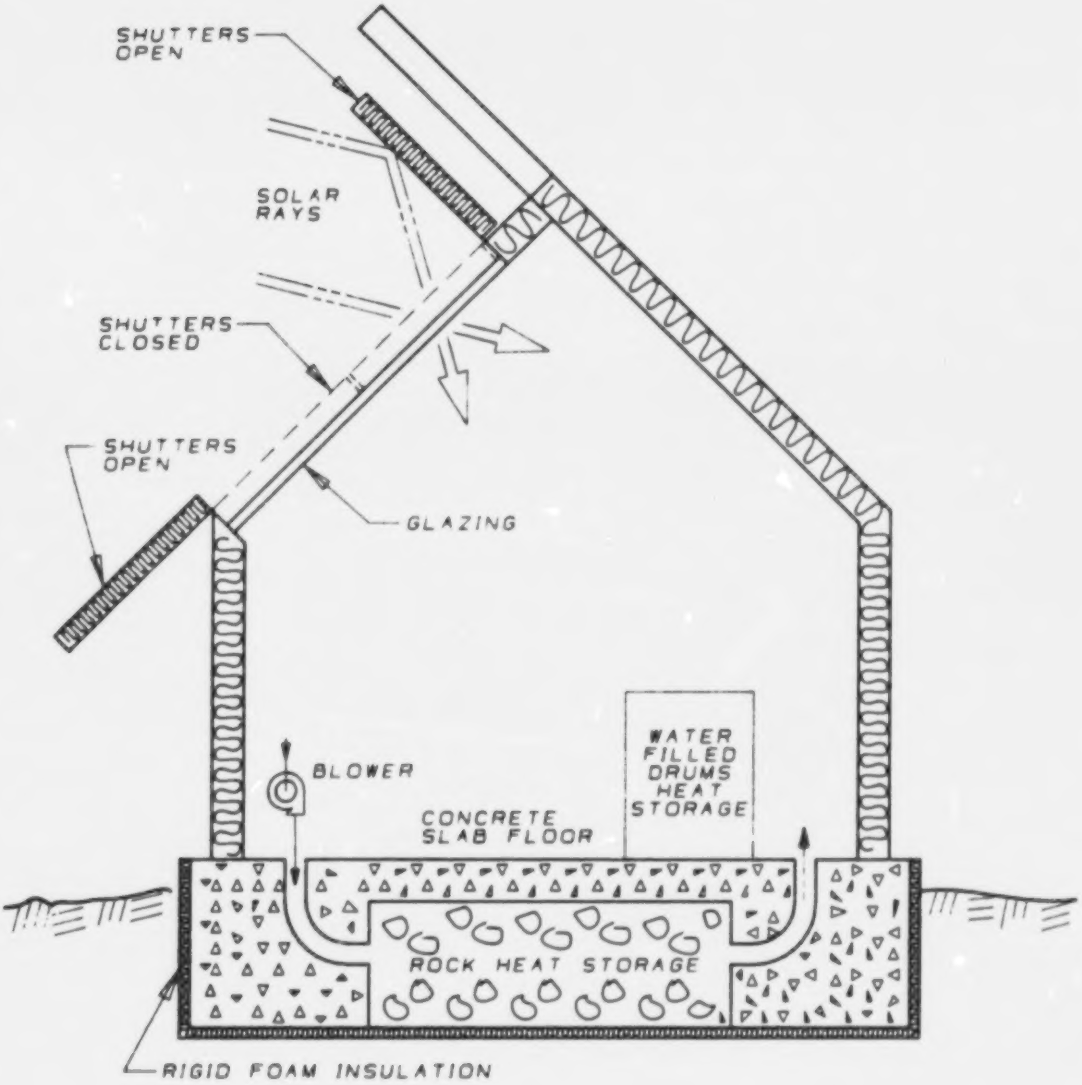
No. 938
Region: South Eastern

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy Mines and Resources Canada
Energie Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638 "a"


SHUTTERS OPEN
SOLAR RAYS
SHUTTERS CLOSED
SHUTTERS OPEN
GLAZING
BLOWER
WATER FILLED DRUMS HEAT STORAGE
CONCRETE SLAB FLOOR
ROCK HEAT STORAGE
RIGID FOAM INSULATION

SOLAR GREENHOUSE INSTALLATION

Energy Ideas.

Project Proponent:

Mr. Ryan Campbell

Technology:

Solarium

Project Location:

Solar Energy Society
227 Campbell Street
Winnipeg, Manitoba R3N 1B4

(204) 489-2780

Project Cost: $10,001.00

Small Scale Support: $7,500.00

Simple Payback Period:

95 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This passive solar project is designed to demonstrate energy efficient solarium construction. The project consists of the following: construction of a solarium along with the production of a slide package on the various construction phases, the production of a slide package on approximately 40 existing solariums in the City of Winnipeg and on 12 different commercially available modular solarium kits. The slide packages shall serve for educational and information transfer purposes.

The 4.9 x 6.1 m (16 x 20 ft) solarium is attached to the west wall of an existing single family dwelling. The solarium is supported on posts with 51 x 203 mm (2 x 8 in) nominal floor joists and 51 x 152 mm (2 x 6 in) nominal wall studs. The solarium is insulated with glass fibre to the following R values: ceiling, R-40, walls, R-20 and floor, R-28. A 6 mil polyethylene air/vapour barrier is applied over the insulation. Strapping, consisting of 51 x 51 mm (2 x 2 in) nominal lumber is nailed perpendicular to and over the wall studs and air/vapour barrier. This allows the installation of electrical outlets without penetrating the air/vapour barrier.

The south wall of the solarium is glazed with 6.7 m^2 (72 ft^2) of Kalwall double glazed, glass fibre, reinforced plastic insulation panels. The vertical panels are spaced 38 mm (1.5 in) apart and provide an isulating value of R-2.2.

A thermostatically controlled blower transfers excess heat from the solarium space into the existing dwelling.

The south roof of the solarium is sloped at 50° to the horizontal. This allows for future installation of an active solar domestic water heating system.

This installation should provide up to approximately 3500 kWh/year (11,940,000 Btu/year) of solar energy gain during the heating season. Based on electrical energy costs this is equivalent to a savings of $105/year, providing a simple payback of 95 years.

The purpose of this project is to provide information on solarium designs and operation.

No. 940
Region: Winnipeg

MG 12211

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"

Energy Ideas.

Project Proponent

Mr. Kenneth Reynolds

Technology:

Windmill

Project Location

Box 1269
Killarney, Manitoba R0K 1G0

(204) 523-8777

Project Cost: $10,884.00

Small Scale Support: $7,500.00

Simple Payback Period:

30 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This windmill installation supplements the utility electrical energy supply to a farming operation.

A Zeus-16 horizontal axis wind powered electric generator on a 15.3 m (50 ft) tower is used for this installation. The unit features a wooden 4.9 m (16 ft) diameter three-bladed rotor with automatic pitch control for constant speed operation. The windmill operates upwind and has aerodynamic overspeed protection. Normal rotor operating speed is 180 rpm. Cut-in wind speed is 14.4 km/h (9 mph) and maximum design wind speed is 192 km/h (120 mph).

A two stage transmission, providing a 21:1 speed increase ratio, couples the rotor to the induction generator. The oil filled transmission contains case hardened steel gears.

A 3 kW brushless induction generator provides a 230 VAC, 60 Hz, single phase synchronous output. Power is transmitted from the generator through slip rings in the yaw plate. A control panel activates a relay at the 14.4 km/h (9 mph) cut-in wind speed thus coupling the generator to the utility line. The generator will not produce electricity during a utility power interruption caused by a power failure or scheduled maintenance. This safety feature prevents the wind generator from back feeding power into the utility system during hydro crew maintenance.

The wind generator has a maximum output of 3000 W at a wind speed of approximately 35.2 km/h (22 mph). It is estimated that this system will generate an average of 1000 kWh per month. At present electrical energy costs, the savings should be $360.00/year providing a simple payback of 30 years.

The purpose of this project is to confirm the economics of operating this type of facility.

MG 12548

No. 942
Region: South Western

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
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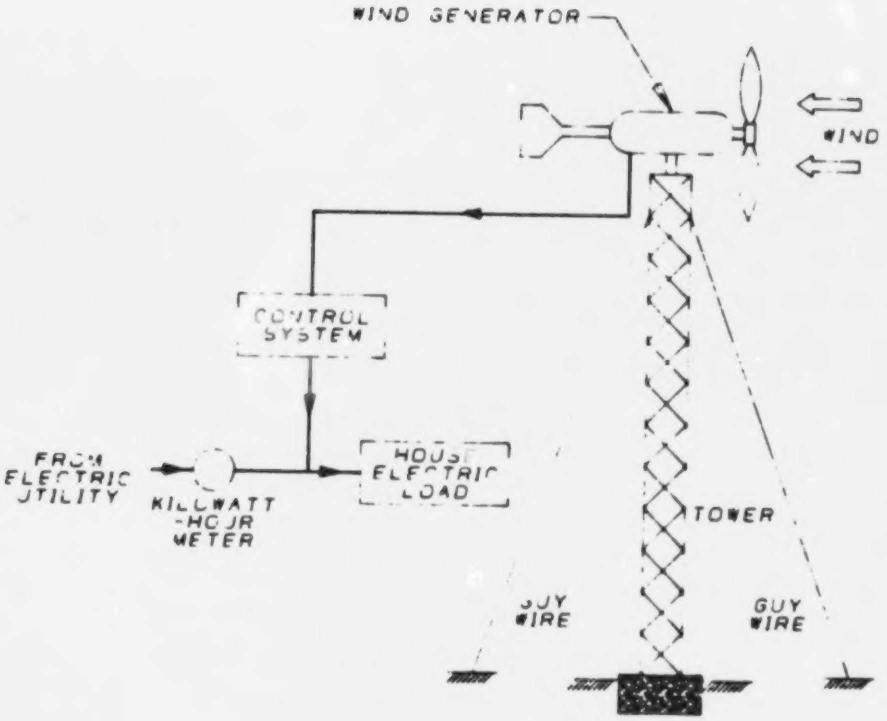
WIND GENERATOR
WIND
CONTROL SYSTEM
FROM ELECTRIC UTILITY
KILOWATT -HOUR METER
HOUSE ELECTRIC LOAD
TOWER
GUY WIRE
GUY WIRE

WINDMILL INSTALLATION

Energy Ideas.

Project Proponent:
Wildon Resource Dev. Corporation Ltd.

Technology:
Windmill — Drainage

Project Location:

Box 448
Gimli, Manitoba R0C 1B0

(204) 642-8958

Project Cost: $16,436.00
Small Scale Support: $7,500.00

Simple Payback Period:
55 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This windmill installation provides drainage to approximately 90 ha (220 acres) of diked marshland near Gimli.

The 18 blade, 3.7 m (12 ft) diameter horizontal axis windmill is mounted on a 12.2 m (40 ft) tower. The blade tip speed to wind speed ratio is approximately 1. A submersed 102 mm (4 in) nominal diameter centrifugal pump is directly driven through a 90° gear box. The gear box has a 2:1 speed increase ratio.

This system should be capable of pumping 91,000 m^3 (20,000,000 Imp. gal) of water from April 1 to Sept. 30. This is based on wind data for the St. Andrews airport, a 30% windmill efficiency, a 25% average pump efficiency and a 1.2 m (4 ft) pumping head.

Presently there is no electricity at the site. To provide a similar pumping capacity using a gasoline engine driven pump would cost approximately $300.00 per year in fuel costs. Therefore the simple payback would be approximately 55 years. However, this does not take into consideration the extra maintenance, depreciation and monitoring costs associated with a gasoline driven system.

The purpose of this project is to confirm the economics of operating this type of installation.

No. 943
Region: East Central

MG-12138

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
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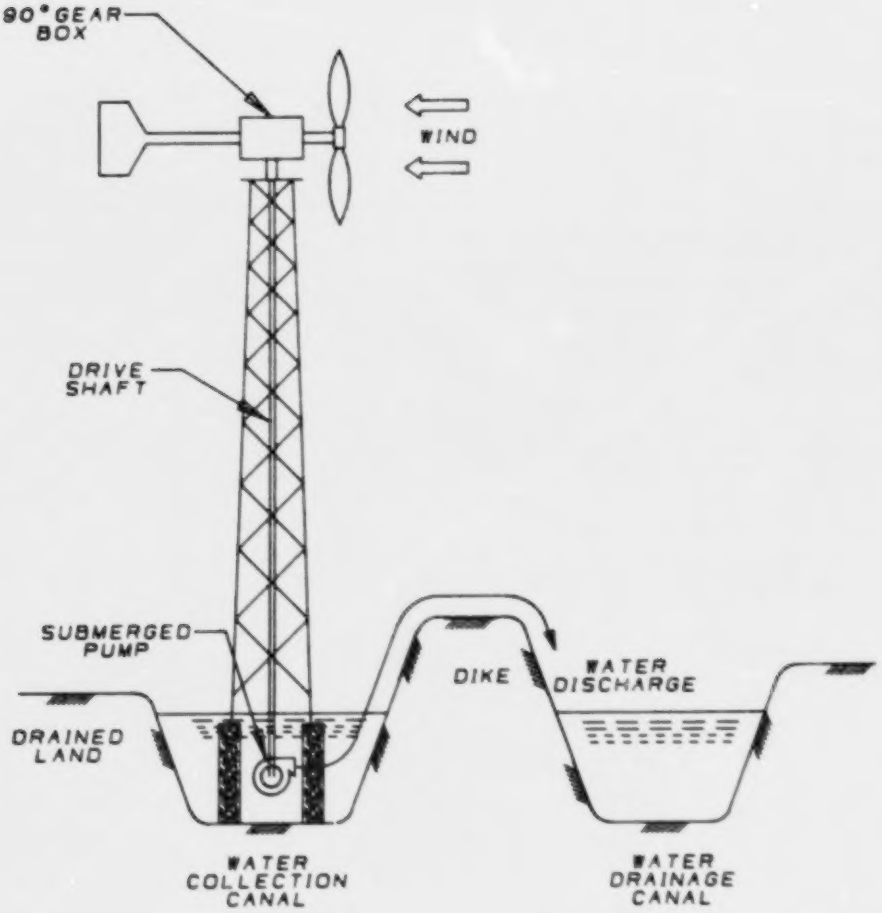
90° GEAR BOX
WIND
DRIVE SHAFT
SUBMERGED PUMP
DIKE
WATER DISCHARGE
DRAINED LAND
WATER COLLECTION CANAL
WATER DRAINAGE CANAL

WINDMILL DRAINAGE INSTALLATION

Energy Ideas.

Project Proponent:

Mr. & Mrs. Amee Carriere

Technology

Windmill

Project Location:

Box 21, R.R. #2
Ste Anne, Manitoba R0A 1R0

(204) 866-2601

Project Cost: $16,597.00

Small Scale Support: $6,500.00

Simple Payback Period:

46 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This windmill installation supplements the utility electrical energy supply for a rural home.

An Enertec Model 4000 horizontal axis wind generator mounted on a 18.3 m (60 ft) tower is used for this installation. The unit features a wooden 6 m (19.6 ft) diameter, three-bladed fixed pitch rotor. The windmill operates down wind and has overspeed protection. Shutdown is accomplished by a windspeed actuated mechanical brake with rotor tip aerodynamic brakes providing emergency back-up protection. The mechanical brake is controlled by an anemometer signal fed to the control box. Cut-in windspeed is 11.2 km/h (7 mph) and cut-out windspeed is 80 km/h (50 mph).

The induction generator automatically adjusts its voltage to that of the utility line. Automatic shutdown of the wind generator is provided in the event of a utility power interruption caused by a power failure or scheduled maintenance. This safety feature prevents the wind generator from back feeding power into the utility system during hydro crew maintenance.

It is estimated that this system will generate an average of 1000 kWh per month based on windspeed data for the area. At present day electrical energy costs the savings should be $360.00/year, providing a simple payback of 46 years.

MG 12239

No. 944
Region: South Eastern

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada

Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
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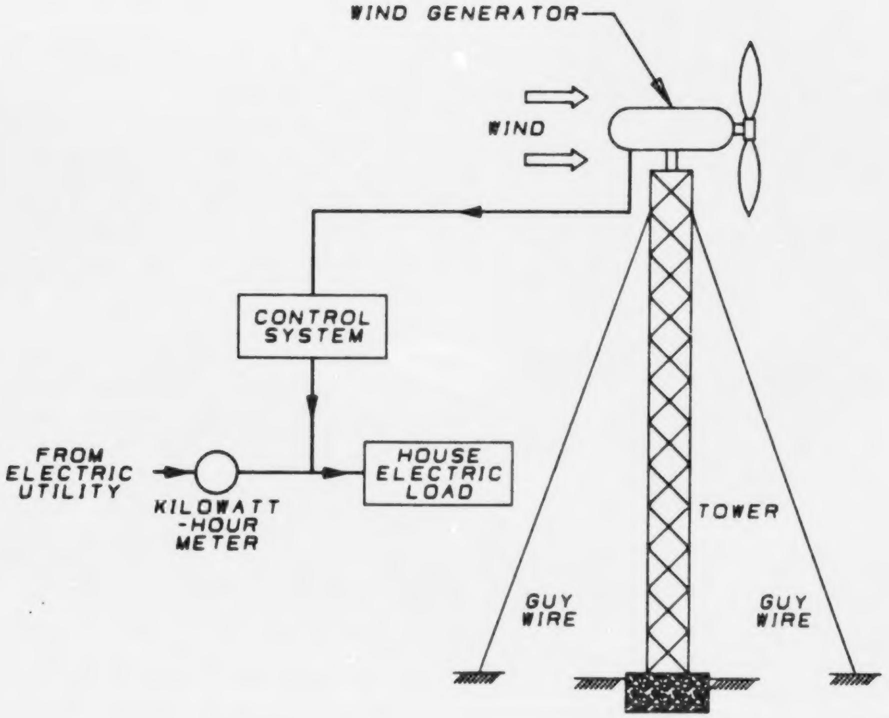
WIND GENERATOR
WIND
CONTROL SYSTEM
FROM ELECTRIC UTILITY
KILOWATT -HOUR METER
HOUSE ELECTRIC LOAD
TOWER
GUY WIRE
GUY WIRE

WINDMILL INSTALLATION

Energy Ideas.

Project Proponent: Mr. & Mrs. Michael Klym	Technology: Windmill
Project Location: Box 6K, R.R. #2 Ste. Anne, Manitoba R0A 1R0	(204) 866-3461
Project Cost: $13,410.00 Small Scale Support: $5,700.00	Simple Payback Period: 37 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This windmill installation supplements the utility electrical energy for a rural home.

An Enertec Model 4000 horizontal axis wind generator mounted on a 18.3 m (60 ft) tower is used for this installation. The unit features a wooden 6 m (19.6 ft) diameter, three-bladed fixed pitch rotor. The windmill operates down wind and has overspeed protection. Shutdown is accomplished by a windspeed actuated mechanical brake with rotor tip aerodynamic brakes providing emergency back-up protection. The mechanical brake is controlled by an anemometer signal fed to the control box. Cut-in windspeed is 11.2 km/h (7 mph) and cut-out windspeed is 80 km/h (50 mph).

The induction generator automatically adjusts its voltage to that of the utility line. Automatic shutdown of the wind generator is provided in the event of a utility power interruption caused by a power failure or scheduled maintenance. This safety feature prevents the wind generator from back feeding power into the utility system during hydro crew maintenance.

In this installation, an output of 4600 W has been measured at a windspeed of 46.4 km/hr (29 mph).

It is estimated that the system will generate an average of 1000 kWh per month based on windspeed data for the area. At present day electrical energy costs the savings should be $360.00/year, providing a simple payback of 37 years.

No. 947
Region: South Eastern

MG 12238

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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Energy, Mines and Resources Canada
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Manitoba
Energy and Mines

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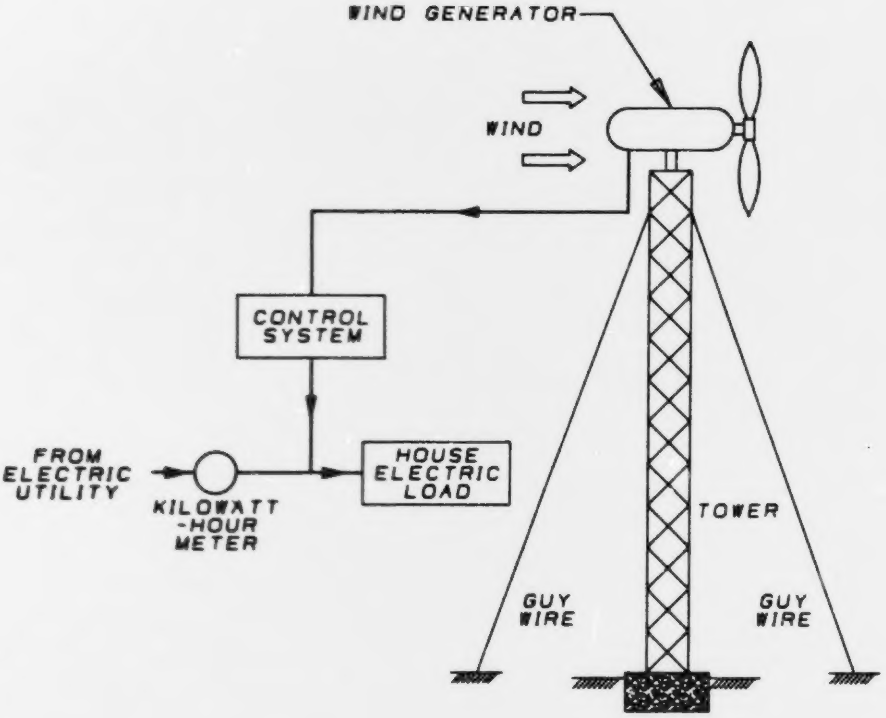
WIND GENERATOR
WIND
CONTROL SYSTEM
FROM ELECTRIC UTILITY
KILOWATT -HOUR METER
HOUSE ELECTRIC LOAD
TOWER
GUY WIRE
GUY WIRE

WINDMILL INSTALLATION

Energy Ideas.

Project Proponent: Mr. Don Ballageer	Technology: Wood

Project Location:
Ballageer's Dairy
Box 365
Pilot Mound, Manitoba R0G 1P0
(204) 825-2740

Project Cost: $8,706.00	Simple Payback Period:
Small Scale Support: $4,000.00	3 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This wood burning furnace and heat distribution system provides heating for a workshop and for the milking parlour, equipment room and milk storage room of a dairy barn. Later, the system will be expanded to heat the calf pen area of the dairy barn. The furnace is located in an enclosed section of the workshop.

The 1.2 m wide x 1.5 m high x 3.7 m long furnace is constructed of 6 mm (0.25 in) thick steel plate. Four off-set baffles are installed on the flue pipe end of the furnace. The 2.8 m (9.3 ft) long combustion chamber allows the use of full cord length logs. A 1545 L (340 Imp gal) vented rectangular tank containing a 50 - 50 glycol-water mixture is located on top of the furnace.

A pump circulates the glycol-water mixture from the tank through underground plastic piping to heat exchangers in the dairy barn and then back to the tank. A portion of the water is circulated through coils in the combustion chamber to enhance the heat transfer. Heated air in the furnace room is also delivered to the barn using a duct and blower. Heat is delivered to the adjacent workshop in a similar manner, through an opening in the common wall.

A motorized damper control senses the tank outlet water temperature to control the combustion air damper opening and therefore the wood combustion rate.

This installation should replace $3,000.00/year in oil and electrical heating costs providing a simple payback of three years. Wood is in plentiful supply on the farm.

The purpose of this project is to demonstrate the economics of operating this system.

No. 948
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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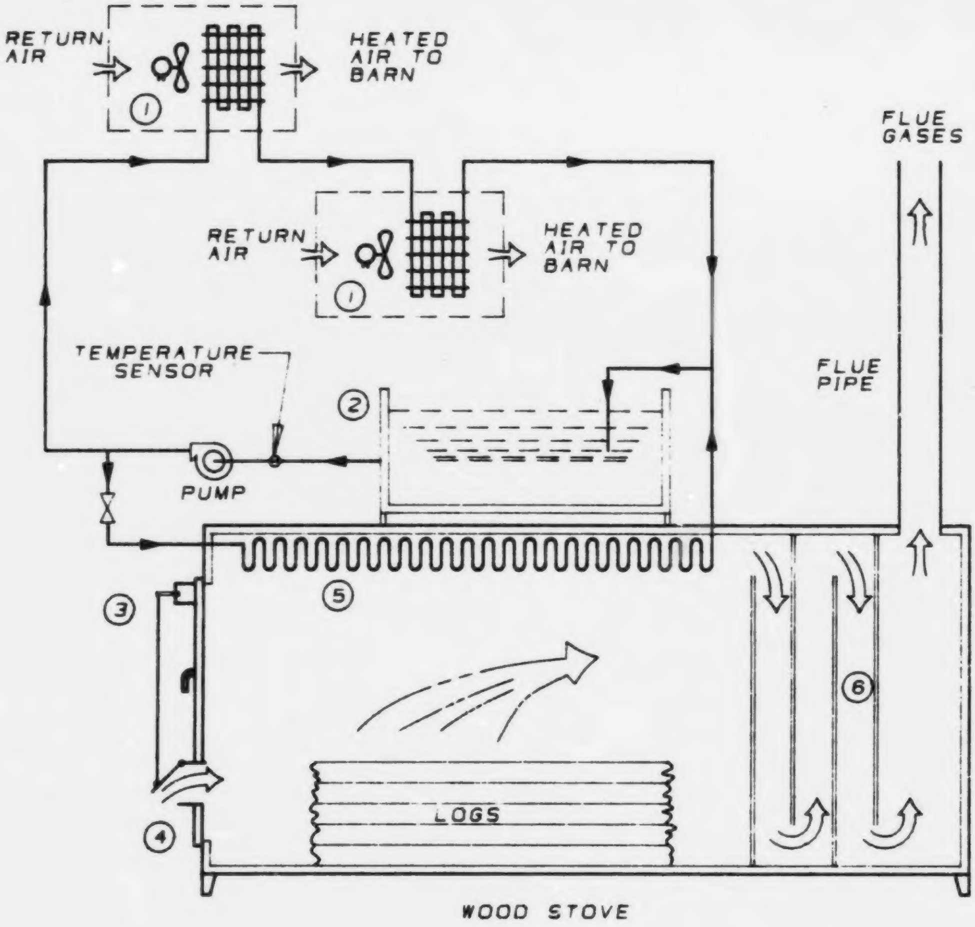
RETURN AIR
HEATED AIR TO BARN
①
RETURN AIR
HEATED AIR TO BARN
①
FLUE GASES
FLUE PIPE
TEMPERATURE SENSOR
②
PUMP
③
⑤
⑥
LOGS
④
WOOD STOVE

LEGEND

① GLYCOL/WATER TO AIR HEAT EXCHANGER
② HEATED GLYCOL/WATER TANK
③ DAMPER CONTROL
④ AIR INLET DAMPER
⑤ GLYCOL/WATER COIL IN FIRE BOX
⑥ BAFFLES

WOOD FIRED FURNACE INSTALLATION

Energy Ideas.

Project Proponent:

N.C.O. Project Rene Inc.

Technology:

Passive Solar-Trombe Wall

Project Location:

Box 360
The Pas, Manitoba R9A 1K5

(204) 623-2662

Project Cost: $25,045.00

Small Scale Support: $7,500.00

Simple Payback Period:

32 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This passive solar trombe wall installation provides supplementary heating to a remote native training camp building. The primary heating system uses electric baseboards with a total output of 8 kW.

The 9.1 x 12.8 m (30 x 42 ft) building containing the trombe wall is of stackwall construction. The 610 mm (24 in) thick walls consist of approximately 102 to 152 mm (4 to 6 in) diameter spruce posts perpendicular to the wall plane. The posts are spaced approximately 152 mm (6 in) apart and held in place with a 102 mm (4 in) thick mortar layer at the inside and outside wall surface. The space between the masonry surfaces and logs is filled with a wood shavings-lime mixture. The estimated insulating value for this construction is R-20. The ceiling and floor of the building are insulated with 152 mm (6 in) of glass fiber, providing a thermal resistance rating of R-20.

Four 1219 x 1880 mm (48 x 74 in) double glazed thermopane windows are located on the south wall of the building. The trombe wall is located inside the building in front of these southern exposed windows and is constructed of concrete blocks. The outward facing surface of the trombe wall is painted black.

Air heated in the space between the trombe wall and windows is circulated to the main building space by natural convection through the openings at the top and bottom of the trombe wall. The trombe wall also stores a portion of the energy for release by radiation and convection to the building space during night time and cloudy periods. Insulating shutters are provided for night time heat retention.

The building is new and therefore there is no historic heating cost data available. It is estimated that the passive solar portion of the construction costs are $8,000.00 and will save up to $250.00/year in electrical heating cost providing a simple payback of approximately 32 years.

The purpose of this project is to confirm the economics of the passive solar and stackwall construction.

No. 949
Region: Northern

MG-12137

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada

Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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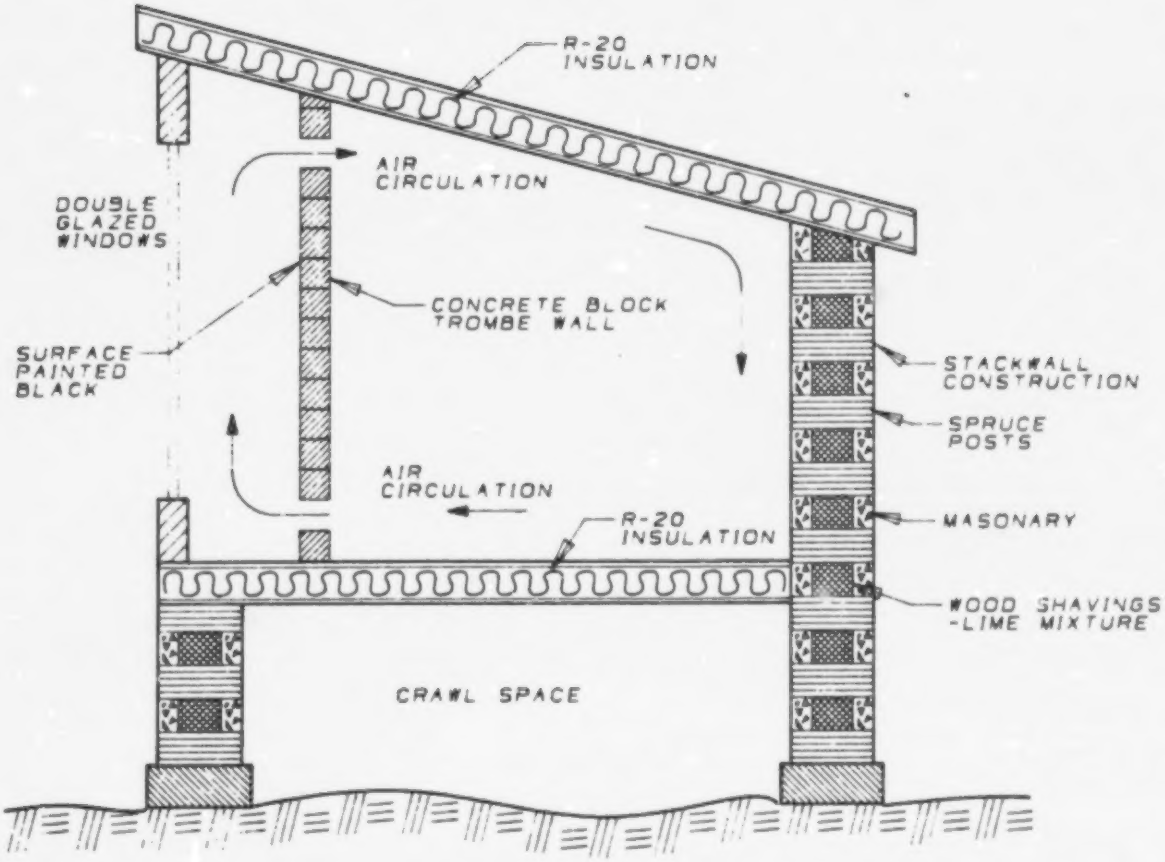

R-20 INSULATION
AIR CIRCULATION
DOUBLE GLAZED WINDOWS
CONCRETE BLOCK TROMBE WALL
SURFACE PAINTED BLACK
STACKWALL CONSTRUCTION
SPRUCE POSTS
AIR CIRCULATION
R-20 INSULATION
MASONARY
WOOD SHAVINGS -LIME MIXTURE
CRAWL SPACE

PASSIVE SOLAR - TROMBE WALL INSTALLATION

Energy Ideas.

Project Proponent:

Mr. Guy Dugas

Technology:

Passive Solar

Project Location:

418 Rosedale Avenue
Winnipeg, Manitoba R3L 1M2

(204) 475-5167

Project Cost: $3,019.00

Small Scale Support: $1,510.00

Simple Payback Period:

6.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This passive solar project is designed to demonstrate the "sunscoop principle" of increasing the amount of solar gain through a fixed glazed area.

The amount of heat gained by passive solar homes is a function of the glazed area exposed to the sun. Glazing also results in high night time heat losses.

For this project, the "sunscoop principle" is applied to the 3 x 6.1 m (10 x 20 ft) addition on the south side of an older home. A low sloped roof section below the upper windows is covered with a reflective material. This reflective film is designed to concentrate more solar energy through the upper windows than is possible directly. This principle is not applied to the lower windows.

The upper windows have an area of 4.9 m^2 (52.5 ft^2) and the lower window 2.6 m^2 (28 ft^2). Insulating shutters are provided for night time heat retention.

A blower and duct system circulates the heated air from the ceiling area and then back into the space at the floor. A thermostat at the ceiling set at 23°C (74°F) controls the blower.

The estimated payback period for this project is 6.5 years.

The purpose of this project is to demonstrate the economics of operating this type of system.

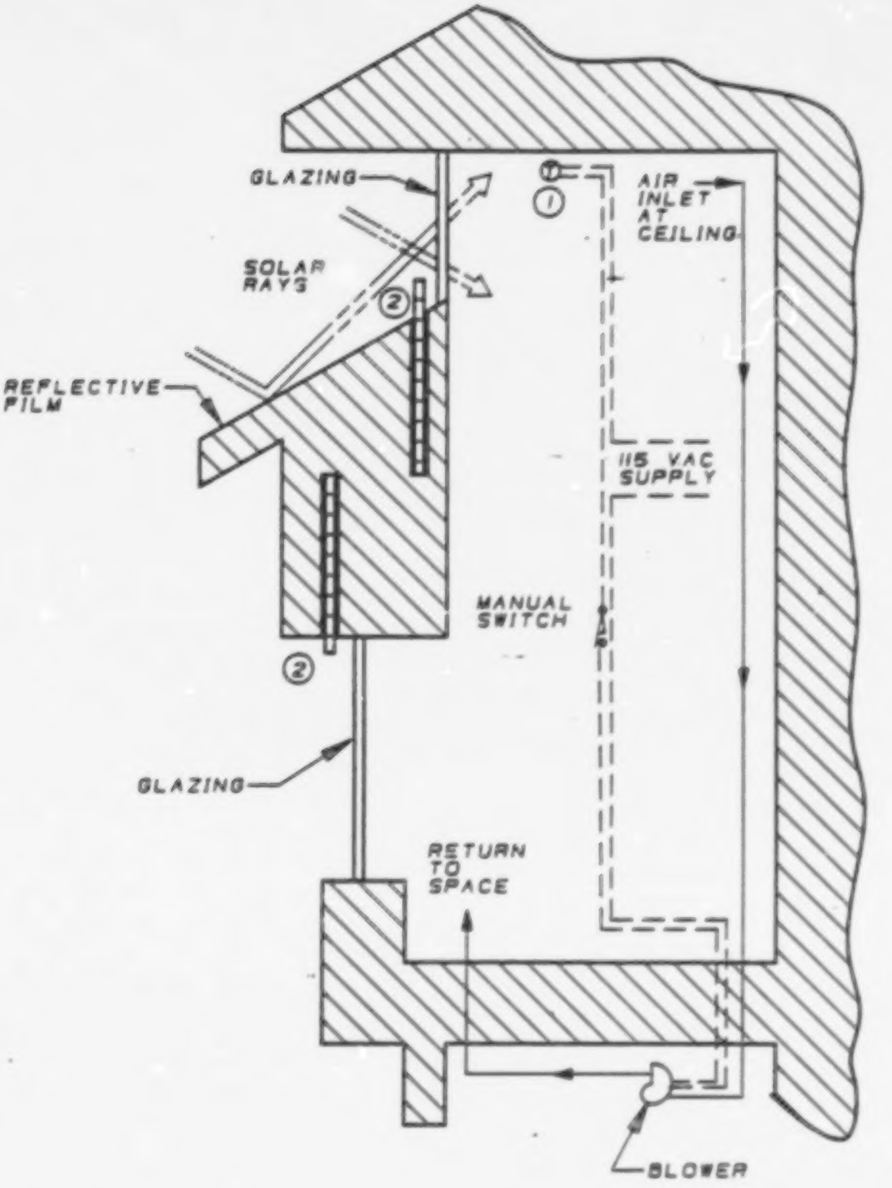
No. 951
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy Mines and Resources Canada
Énergie Mines et Ressources Canada
Hon. Jean Chrétien Minister

MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon Wilson D. Parasiuk Minister


GLAZING
SOLAR RAYS
②
REFLECTIVE FILM
①
AIR INLET AT CEILING
115 VAC SUPPLY
MANUAL SWITCH
②
GLAZING
RETURN TO SPACE
BLOWER

LEGEND

① 115 VAC THERMOSTAT SET AT 23°C (74°F)
② INSULATING SHUTTERS (RETRACTED)

PASSIVE SOLAR INSTALLATION

Energy Ideas.

Project Proponent:

Manitou & Community Swimming Pool

Technology:

Active Solar — Swimming Pool

Project Location:

Box 27
Manitou, Manitoba R0G 1G0

(204) 242-2259

Project Cost: $13,009.00

Small Scale Support: $7,500.00

Simple Payback Period:

5.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This active solar installation provides the primary water heating requirements for a public outdoor swimming pool. The existing propane heating system remains as a back-up. Water is the heat transfer medium for this installation.

Thirty-seven model SP-250-10 Petro-Sun solar panels connected in parallel are used. The panels are 1219 x 3048 mm (4 x 10 ft) each, providing a total collector area of 137.5 m^2 (1480 ft^2). Fifteen of the panels are mounted on an adjacent pool building facing south and 40° to the horizontal. The remaining 22 panels are mounted on an adjacent structure facing south and 40° to the horizontal.

The black-coloured absorber material of the collectors is 90% polypropylene and 10% polyethylene. There is no glazing on the panels. Water flows up through small channels in the absorber material. The swimming pool is L-shaped with a surface area of 255.6 m^2 (2750 ft^2) and holds approximately 455,000 L (100,000 Imp. gal.) of water. Water is maintained in the pool at approximately 27°C (80°F).

The estimated energy cost savings for this installation is $2500.00 per season providing a simple payback of 5.5 years.

The purpose of this project is to demonstrate the economics of operating this type of system.

No. 952
Region: South Central

MG-12136

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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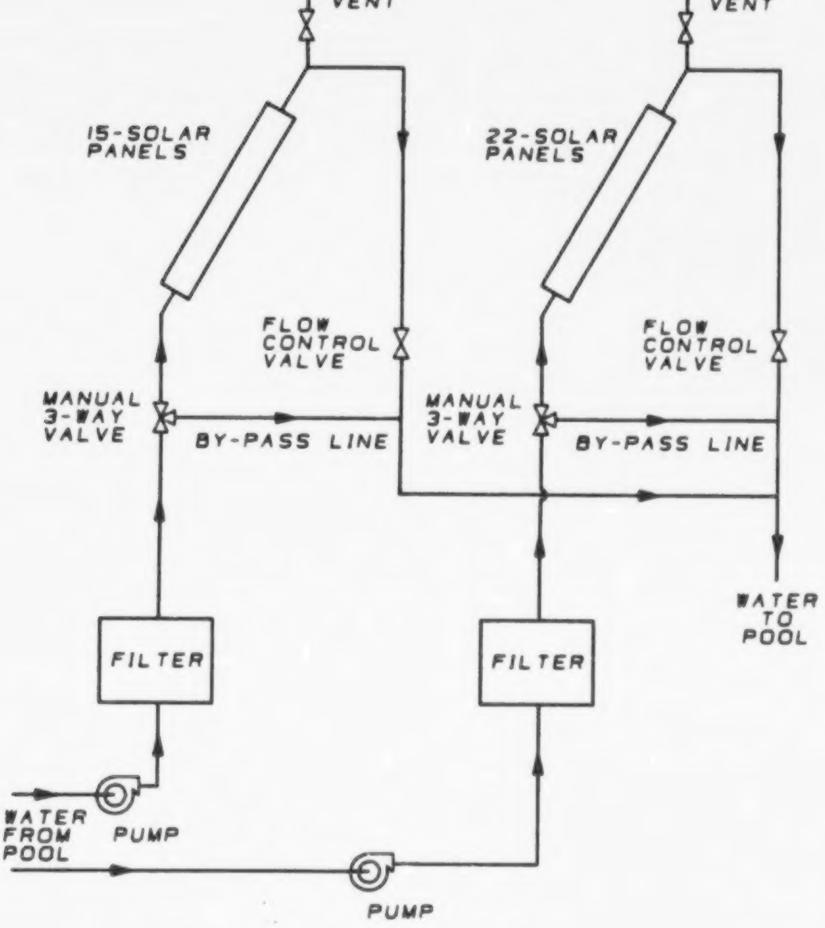
VENT
VENT
15-SOLAR PANELS
22-SOLAR PANELS
FLOW CONTROL VALVE
FLOW CONTROL VALVE
MANUAL 3-WAY VALVE
MANUAL 3-WAY VALVE
BY-PASS LINE
BY-PASS LINE
WATER TO POOL
FILTER
FILTER
WATER FROM POOL
PUMP
PUMP

ACTIVE SOLAR INSTALLATION

Energy Ideas.

Project Proponent	Technology:
The Biomass Energy Institute Inc.	Alternate Fuels — Biomass

Project Location

1329 Niakwa Road
Winnipeg, Manitoba R2J 3T4

(204) 257-3891

Project Cost:	$10,931.00	Simple Payback Period:
Small Scale Support:	$7,500.00	N/A

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This alternate fuels project involves the preparation of a computer based information package on renewable biomass energy options.

A software package has been designed to run on a Commodore 64 computer with floppy disk drive. The user-friendly, interactive software emphasizes colour graphics. The package may be adaptable to the Telidon network.

The package provides source data on different types of wood and agricultural residues, then calculates their energy content. Information is also provided on small scale combustion systems and on the quantities of various types of biomass that would be required to replace a user's current energy supply.

This system will be useful to designers and users of biomass energy systems, especially when conversion from conventional energy sources is considered.

The purpose of this project is to demonstrate the utility of computer aided information systems and to provide a data base and design aid for biomass energy conversion.

MG 12212

No. 953
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada

Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"

Energy Ideas.

Project Proponent

Village of Arborg

Technology

Energy Conservation

Project Location

Box 159
Arborg, Manitoba R0C 0A0

(204) 376-2647

Project Cost $9,066.36

Small Scale Support $6,799.77

Simple Payback Period

5.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description.

This energy efficient retrofit project is designed to reduce the heat energy consumption of a 120.8 m² (1300 ft²) municipal water treatment plant building. The building houses the pumps, one pressure tank and three water softening tanks. Water is supplied from a 203 mm (8 in) diameter by 106.7 m (350 ft) deep well. Work performed under this project is based on the recommendations of an energy audit by Manitoba Energy and Mines.

The building has a concrete slab floor with the following wall construction; 152 mm (6 in) concrete block interior wall, 25 mm (1 in) rigid foam insulation, 38 mm (1.5 in) air space and 102 mm (4 in) exterior brick siding. The roof construction prior to the project installation was as follows, 38 mm (1.5 in) steel deck, air/vapour barrier, 38 mm (1.5 in) rigid insulation and exterior built up roofing.

In this project installation, 76 mm (3 in) of rigid polystyrene insulation was added to the roof area, increasing the insulation value from approximately R-5 to R-20. Also, the one uninsulated water softening tank was insulated with 51 mm (2 in) of rigid glass fibre insulation covering an area of approximately 11.1 m² (120 ft²) and providing an insulating value of approximately R-6. The insulation was bonded to the tank surface followed by a foil-kraft paper air/vapour barrier and an outer canvas layer. The other two water softening tanks were insulated prior to this project.

In addition to the above, the 73.3 kW (250,000 Btu/hr) forced air furnace was replaced by 4 10 kW electric space heaters. Three of the electric heaters are used and one remains on standby. Also, two ceiling fans were installed.

It is estimated that this installation will save up to $1,700/year in energy costs, providing a simple payback of 5.5 years.

The purpose of this project is to demonstrate the economics of this installation.

MG-12422

No. 954
Region: East Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"

Energy Ideas.

Project Proponent: St. Leon Recreational Centre Committee

Technology: Energy Conservation

Project Location: St. Leon, Manitoba R0G 2E0

(204) 744-2208

Project Cost: $10,211.00

Small Scale Support: $5,000.00

Simple Payback Period: 10.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This energy efficient retrofit project is designed to reduce the heat energy usage of a 435 m^2 (4680 ft^2) community centre building.

The project consists of constructing a 3.7 x 3.7 m (12 x 12 ft) air lock shelter at the main entrance situated on the northeast corner of the building. The shelter is insulated with R-20 glass fiber insulation. The outside door is situated on the south side of the shelter.

Combined with sealing and weatherstripping, the air lock should reduce the infiltration heat losses of this building.

The recreational centre has an electrical heating system. It is estimated that this project will save up to 30% of the $3,180.00/year heating costs providing a simple payback of 10.5 years.

The purpose of this project is to demonstrate the economics of operating this type of installation.

No. 955
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy Mines and Resources Canada
Energie Mines et Ressources Canada
Hon Jean Chretien Minister
MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon Wilson D. Parasiuk Minister

Energy Ideas.

Project Proponent:

Birtle Curling Rink

Technology:

Energy Conservation

Project Location:

Birtle, Manitoba
R0M 0C0

(204) 842-5352

Project Cost: $10,245.00

Small Scale Support: $7,500.00

Simple Payback Period:

11 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This energy efficient retrofit project is designed to reduce the heat energy usage of a community curling rink.

The project consists of insulating the roof and walls of the ice area space as recommended by Manitoba Energy and Mines energy auditors. This space is maintained at approximately 0°C (32°F) during curling hours. The roof and walls are insulated using (R-32) glass fibre insulation covering an area of approximately 1255 m^2 (13,500 ft^2). The insulation is covered with a 6 mil polyethylene air/vapour barrier and protected with 13 mm (0.5 in) fir plywood up to 3.7 m (12 ft) above the ice surface.

The estimated savings for this retrofit is $950.00/year of the $4,000/year heating costs. Based on the above, the simple payback period should be 11 years.

The purpose of this project is to demonstrate the economics of operating this type of retrofit.

No. 956
Region: South Western

MG-12135

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie Mines et Ressources Canada

Manitoba
Energy and Mines

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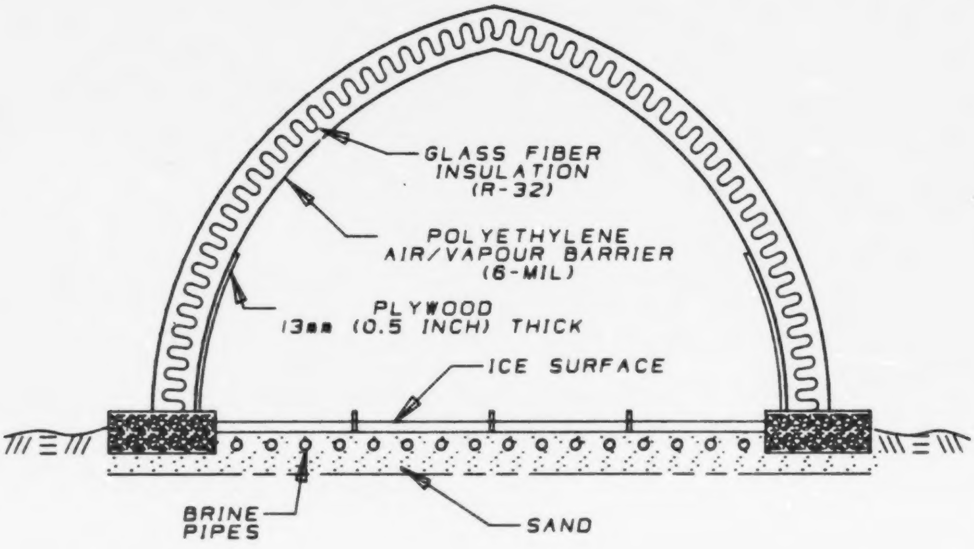
GLASS FIBER INSULATION (R-32)
POLYETHYLENE AIR/VAPOUR BARRIER (6-MIL)
PLYWOOD 13mm (0.5 INCH) THICK
ICE SURFACE
BRINE PIPES
SAND

ENERGY CONSERVING RETROFIT INSTALLATION

Energy Ideas.

Project Proponent: South Interlake Regional Library	Technology: Energy Conservation — Insulation
Project Location: Box 908 361 Main Street Stonewall, Manitoba R0C 2Z0	(204) 467-8415
Project Cost: $2,839.00 Small Scale Support: $2,000.00	Simple Payback Period 6 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This energy efficient retrofit project is designed to reduce the heat energy usage of a public library. The stone building was constructed in 1914 as a post office and is presently registered with Heritage Canada.

The project consists of insulating three basement walls as recommended by a Manitoba Energy and Mines energy audit. The wall cavity around the stairwell is insulated with 89 mm (3.5 in) of cellulose (R-12) covering an area of approximately 15.8 m² (170 ft²). The remaining 51.1 m² (550 ft²) area is framed, insulated with 89 mm (3.5 in) of glass fiber insulation (R-12) and covered with 13 mm (½ in) gypsum board. A polyethylene air-vapour barrier is applied under the gypsum board. Also included is sealing and weather-stripping to reduce infiltration losses.

It is estimated that this project will save up to $450.00/year of the $1,800.00/year heating cost providing a simple payback of 6 years.

The purpose of this project is to demonstrate the economics of this type of retrofit.

No. 957
Region: East Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon. Wilson D. Parasiuk, Minister

Energy Ideas.

Project Proponent: COR Enterprises Ltd.	Technology: Energy Conservation
Project Location: Box 1282 Brandon, Manitoba R7A 6KA	(204) 728-2932
Project Cost: $7,715.36 Small Scale Support: $5,786.52	Simple Payback Period: 5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This energy efficient retrofit project is designed to reduce the heat energy consumption in an "Activity Centre" for handicapped persons. The 650 m² (7000 ft²) three-wing building has a metal clad exterior. The building is heated electrically.

Work performed under this project is based on the recommendations of an energy audit performed by Manitoba Energy and Mines. The project consists of the addition of R-30 glass fiber insulation to the ceiling area and R-10 cellulose insulation to the wall areas. The ceiling was previously insulated with mineral wool (R-5). Also included in this project are sealing and weather-stripping to reduce infiltration losses.

It is estimated that this project installation will save up to $1,500.00/year in heating costs, providing a simple payback of five years.

The purpose of this project is to demonstrate the economics of this type of retrofit.

No. 959
Region: South Western

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638 "a"

Energy Ideas.

Project Proponent: Mr. Stan Watkins	Technology: Heat Pump
Project Location: Clearwater, Manitoba R0K 0M0	(204) 873-2553
Project Cost: $9,815.00 Small Scale Support: $7,362.00	Simple Payback Period: 15 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation, utilizing two wells, provides heating for a 109.3 m² (1176 ft²) single family dwelling. The 102 mm (4 in) diameter supply well is 32 m (105 ft) deep. There is no return well for this installation.

A ground water heat pump takes water from the ground, extracts heat from it and then returns the water to the ground, usually via another well. The supply water is approximately 6°C (43°F) and the return water approximately 3° (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In the summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Friedrich 805/042 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.82 L/s (13 USGPM) the rated output of this heat pump is 11.4 kW (38,800 Btu/hr) for heating and 14.4 kW (49,300 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 3.3 for the above conditions. The C.O.P. does not include the well pump energy requirements.

This system should provide a savings of up to 65% on electrical costs. For a $1,000.00/year heating cost, the savings should be approximately $650.00/year, providing a simple payback of 15 years.

The purpose of this project is to demonstrate the economics of operating of this type of facility.

No. 961
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

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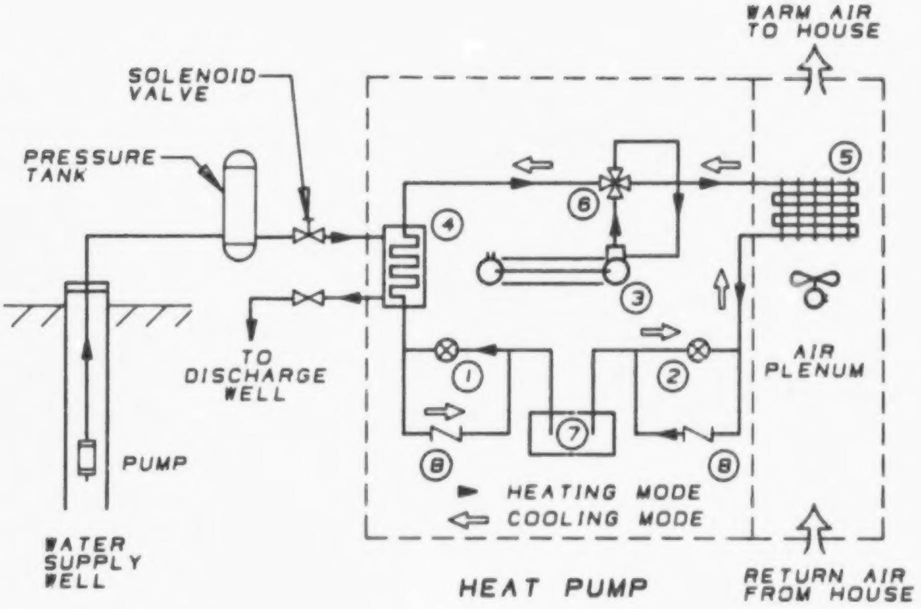
WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
⑤
④
⑥
③
TO DISCHARGE WELL
①
②
⑦
AIR PLENUM
PUMP
⑧
⑧
► HEATING MODE
⇦ COOLING MODE
WATER SUPPLY WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

TWO WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:	Technology:
Mr. Lee Waters	Heat Pump

Project Location:

Water's Drilling Co. Ltd.
Box 53
Roblin, Manitoba R0L 1P0
(204) 937-2626

Project Cost:	$4,467.00	Simple Payback Period:
Small Scale Support:	$3,351.00	6 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating for a 93 m² (1000 ft²) single family dwelling. The 127 mm (5 in) diameter supply well is 30.4 m (100 ft) deep and the 102 mm (4 in) diameter discharge well is 29.6 m (97 ft) deep.

A ground water heat pump takes water from the ground, extracts heat, then returns the water to the ground, usually via another well. Typically, the supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In the summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Friedrich 805/042G heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.63 L/s (10 USGPM) the rated output of the heat pump is 11.1 kW (38,000 Btu/hr) for heating and 14.1 kW (48,100 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 3.3 for the above conditions.

The C.O.P. does not include the well pump energy requirements.

This system should provide a savings of up to 65% based on electricity. For a $1,200.00/year heating cost, the savings should be approximately $780.00/year providing a simple payback of 6 years. The project cost does not include the wells which were in place.

The purpose of this project is to demonstrate the economics of this type of system.

No. 962
Region: West Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

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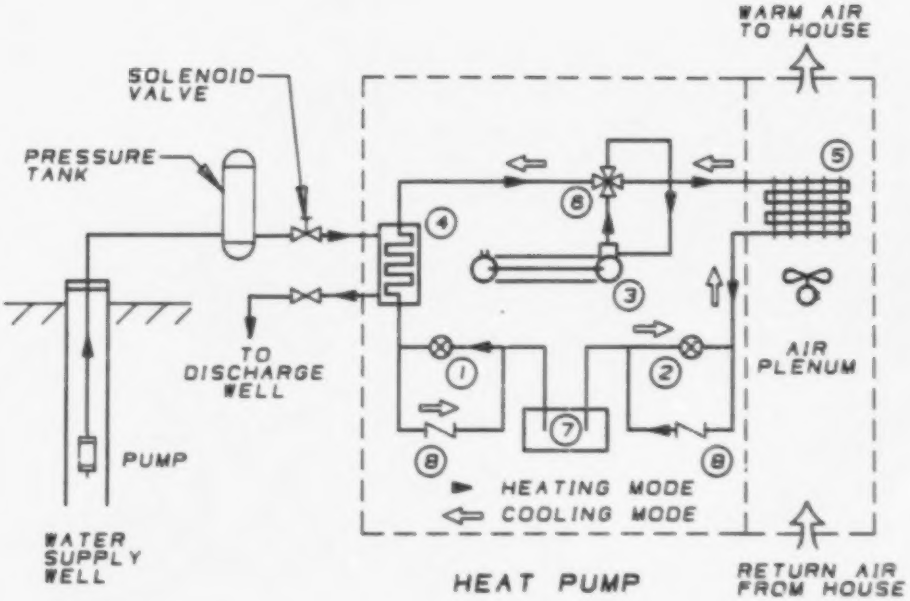

WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
⑤
⑥
④
③
TO DISCHARGE WELL
AIR PLENUM
①
②
⑦
⑧
⑧
PUMP
HEATING MODE
COOLING MODE
WATER SUPPLY WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

TWO WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:	Technology:
Mr. D.A. Samuels	Heat Pump

Project Location:

86 Kirby Drive
Winnipeg, Manitoba R2Y 0E8

(204) 786-5621

Project Cost:	$12,259.00	Simple Payback Period:
Small Scale Support:	$7,500.00	12.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating and cooling to a 232.3 m² (2500 ft²) single family dwelling. The 102 mm (4 in) diameter supply well is 63.1 mm (207 ft) deep and the 102 mm (4 in) diameter discharge well is 61.6 mm (202 ft) deep.

A ground water heat pump takes water from the ground, extracts heat, then returns the water to the ground, usually via another well for this installation. The supply water is approximately 10°C (50°F) and the return water approximately 7°C (44°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In the summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol. A. Terra II Model 064 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.88 L/s (14 USGPM) the rated output of this heat pump is 16.3 kW (55,600 Btu/hr) for heating and 21.6 kW (73,800 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling.

The C.O.P. for heating is given as 2.83 for the above conditions including a well pump requirement of 960 W per L/s (60 W per USGPM).

The heat pump is equipped with a water flowmeter and thermometers. An electric heater in the duct serves as a back up.

This system should provide a savings of 65% based on electricity. For a $1500.00/year heating cost, the savings should be approximately $975.00/year providing a simple payback of 12.5 years.

The purpose of this project is to demonstrate the economics of operating this type of system.

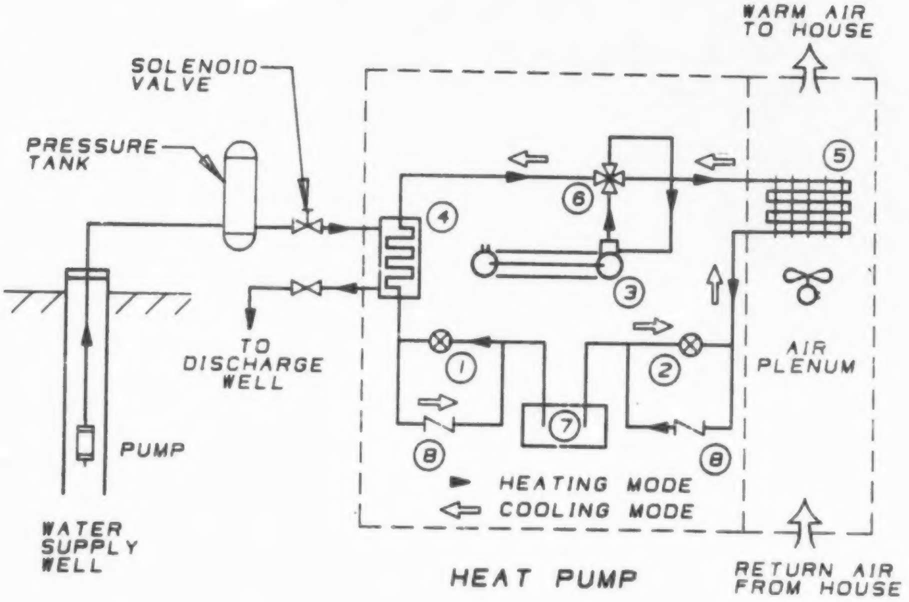
No. 963
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"


WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
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TO DISCHARGE WELL
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AIR PLENUM
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8
8
PUMP
► HEATING MODE
⇦ COOLING MODE
WATER SUPPLY WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

TWO WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:	Technology:
Scriptam Industries (Western) Ltd.	Heat Pump

Project Location:

1041 — 1049 Erin Street
Winnipeg, Manitoba R3G 2X1

(204) 786-5621

Project Cost:	$17,465.00	Simple Payback Period:
Small Scale Support:	$7,500.00	11 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating and cooling to a 604 m² (6500 ft²) commercial building. The 127 mm (5 in) diameter wells are each 48.8 m (160 ft) deep.

A ground water heat pump takes water from the ground, extracts heat, then returns the water to the ground, usually via another well. For this installation, the supply water is approximately 8°C (47°F) and the return water approximately 6°C (43°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

Two Mammoth Sol. A. Terra II Model 064 heat pumps are used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.88 L/s (14.0 USGPM) the rated output of this heat pump is 16.3 kW (55,500 Btu/hr) for heating and 21.6 kW (73,800 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.83 for the above conditions including a well pump requirement of 960 W per L/s (60 W per USGPM).

The heat pumps are equipped with water flow meters and water thermometers. An electric heater in the duct serves as a back-up.

This system should provide a savings of 65% based on electricity. For a $2,500.00/year heating cost, the savings should be approximately $1,625.00/year providing a simple payback of 11 years.

The purpose of this project is to demonstrate the economics of operating this type of system.

No. 964
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon Wilson D. Parasiuk, Minister

Energy Ideas.

Project Proponent:

Mr. D.R. Halligan

Technology:

Heat Pump

Project Location:

87 South Lake Drive
Winnipeg, Manitoba R2Y 1T5

(204) 889-2644

Project Cost: $13,263.00

Small Scale Support: $5,985.00

Simple Payback Period:

29 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating for a 139.4 m² (1500 ft²) single family dwelling. The 178 mm (7 in) diameter well is 68.6 m (225 ft) deep. The existing gas furnace is used as a back-up.

A ground water heat pump takes water from the ground, extracts heat from it and then returns the water to the ground, usually via another well. However, for this installation a single well is used. The supply water is taken from a depth of 29 m (95 ft) and discharged into the same well at a depth of 61 m (200 ft). The supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol. A. Terra II Model 045 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.47 L/s (7.5 USGPM) the rated output of this heat pump is 11.0 kW (37,500 Btu/hr) for heating and 16.3 kW (55,600 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.82 for the above conditions including a well pump requirement of 960 W per L/s (60 W per USGPM).

This system should provide a savings of 45% based on natural gas. For a $1,000.00/year heating cost, the savings should be approximately $450.00/year providing a simple payback of 29 years

The purpose of this project is to demonstrate the economics of operating this type of system.

No. 966
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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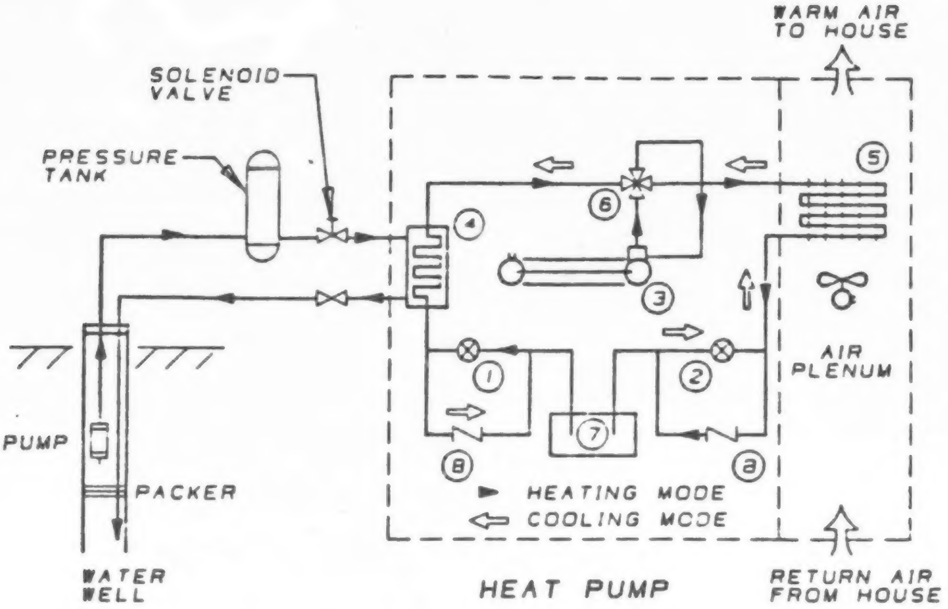
WARM AIR
TO HOUSE
SOLENOID
VALVE
PRESSURE
TANK
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⑥
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AIR
PLENUM
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⑦
⑧
⑧
PUMP
PACKER
WATER
WELL
► HEATING MODE
⇦ COOLING MODE
HEAT PUMP
RETURN AIR
FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

SINGLE WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent: Mr. A. Thompson

Technology: Heat Pump

Project Location:

General Delivery
Lockport, Manitoba R0C 1W0
(204) 757-2020

Project Cost: $17,643.00

Small Scale Support: $7,470.00

Simple Payback Period: 13.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating and cooling for a 363 m² (3900 ft²) restaurant. The 127 mm (5 in) diameter supply well is 42.7 m (140 ft) deep and the 127 mm (5 in) diameter discharge well is 33.5 m (110 ft) deep.

A ground water heat pump takes water from the ground, extracts heat, then returns the water to the ground, usually via another well. Typically, the supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

Two Friedrich 805/060 heat pumps are used for this installation. At a water supply temperature of 7°C (45°F) and water flow of 0.88 L/s (14 USGPM) the rated output of this heat pump is 15.7 kW (53,600 Btu/hr) for heating and 21.1 kW (72,000 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 3.1 for the above conditions.

This installation is in a new building and therefore there is no data on previous heating costs. However, it is estimated that it would cost approximately $2,000.00/year for heating by conventional means. Therefore a savings of up to $1,300.00/year may be realized providing a simple payback of approximately 13.5 years.

The purpose of this project is to demonstrate the economics of operating this type of system.

No. 967
Region: East Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon Wilson D. Parasiuk, Minister

Energy Ideas.

Project Proponent:

Mr. Guy Carriere

Technology:

Heat Pump

Project Location:

Box 89
Ile des Chenes, Manitoba R0A 0T0

(204) 878-3662

Project Cost: $9,003.00

Small Scale Support: $6,750.00

Simple Payback Period:

14 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating for a single family dwelling.

The supply well and the return well are both 102 mm (4 in) in diameter and approximately 36.6 m (120 ft) deep.

A ground water heat pump takes water from the ground, extracts heat from it and then returns the water to the ground, usually via another well. Typically, the supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol. A Terra II Model 035 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.47 L/s (7.5 USGPM) the rated output of this heat pump is 9.2 kW (31,400 Btu/hr) for heating and 14.3 kW (48,700 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.83 for the above conditions including a well pump requirement of 960 W per L/s (60 W per USGPM).

This system should provide a savings of 65% based on electricity. For a $1,000.00/year heating cost, the savings should be approximately $650.00/year providing a simple payback of 14 years.

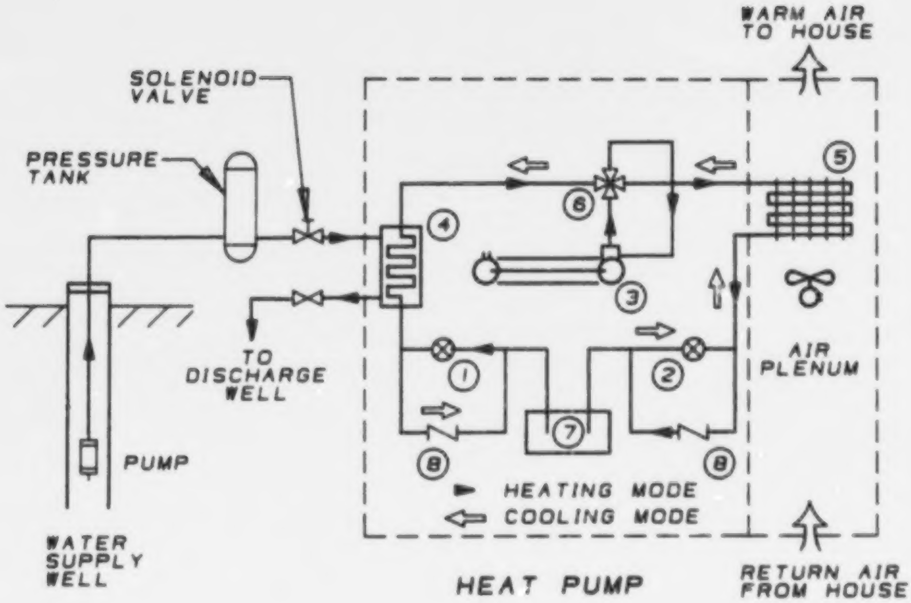
The purpose of this project is to demonstrate the economics of operating this type of installation.

No. 968
Region: South Eastern

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
MG-638 "a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon. Wilson D. Parasiuk, Minister


WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
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TO DISCHARGE WELL
AIR PLENUM
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⑧
PUMP
► HEATING MODE
⇦ COOLING MODE
WATER SUPPLY WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

TWO WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:

Mr. George Davis

Technology:

Heat Pump

Project Location:

230 Creek Bend Rd.
Winnipeg, Manitoba R2M 4A3

(204) 256-6928

Project Cost: $11,172.00

Small Scale Support: $5,000.00

Simple Payback Period:

17 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating for a 167.3 m² (1800 ft²) two level single family dwelling. Both the supply well and the return well are 102 mm (4 in) in diameter and are 27.4 m (90 ft) deep.

A ground water heat pump takes water from the ground, extracts heat from it and then returns the water to the ground, usually via another well. Typically, the supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol. A Terra II Model 064 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.88 L/s (14 USGPM) the rated output of this heat pump is 16.3 kW (55,600 Btu/hr) for heating and 21.6 kW (73,800 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.83 for the above conditions including a well pump requirement of 960 W per L/s (60 W per USGPM).

This system should provide a savings of up to 65% based on electricity. For a $1,000.00/year heating cost, the savings is approximately $650.00/year providing a simple payback of 17 years.

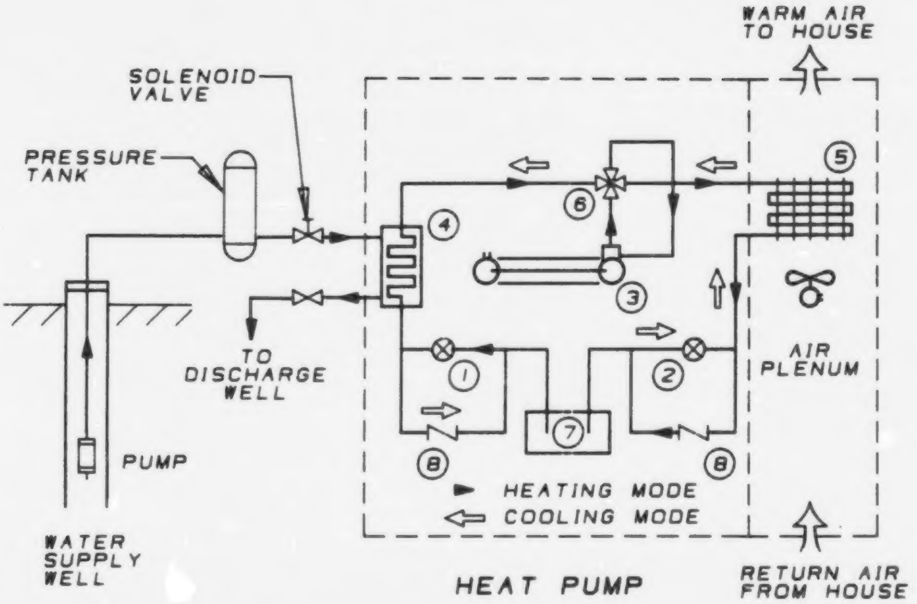
The purpose of this project is to demonstrate the economics of operating this type of system.

No. 969
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon. Wilson D. Parasiuk, Minister


WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
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TO DISCHARGE WELL
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AIR PLENUM
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PUMP
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HEATING MODE
COOLING MODE
WATER SUPPLY WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

TWO WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:

Mr. John Kalyta

Technology:

Heat Pump

Project Location:
Rapid Flow Industries Ltd.
899 Winnipeg Avenue
Winnipeg, Manitoba R3E 0S1

(204) 774-7393

Project Cost: **$15,000.00**

Small Scale Support: **$7,500.00**

Simple Payback Period:

23 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating for a 185.9 m^2 (2000 ft^2) split level single family dwelling. The 102 mm (4 in) diameter supply and discharge wells are 103.7 m (340 ft) and 50.3 m (165 ft) deep respectively.

A ground water heat pump takes water from the ground, extracts heat from it and then returns the water to the ground, usually via another well. Typically, the supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (COP).

For this installation, the proponent has built the heat pump from existing components. One feature of this heat pump is the two speed compressor which provides two different outputs depending on the energy demand. This is expected to provide a higher seasonal performance factor (SPF) than normally obtained with conventional heat pumps.

This heat pump cannot be reversed to provide cooling, but will incorporate an air-to-water heat exchanger for direct cooling.

Although the performance of this heat pump is still unknown, based on conventional heat pumps, the system should provide a savings of up to 65% based on electricity. For a $1,000/year heating cost, the savings should be approximately $650/year providing a simple payback of 23 years.

The purpose of this project is to demonstrate the functional operation and economics of operation of this type of system.

No. 970
Region: Winnipeg

MG 12398

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638 "a"

Energy Ideas.

Project Proponent:

Mr. Wilfred Arnason

Technology:

Heat Pump

Project Location:

Box 448
Gimli, Manitoba R0C 1B0

(204) 642-8958

Project Cost: $9,022.00

Small Scale Support: $4,512.00

Simple Payback Period:

11.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation, utilizing a single artesian well, provides heating for a 149 m^2 (1600 ft^2) single family dwelling. The well is 51 mm (2 in) in diameter and 26.5 m (87 ft) deep.

A ground water heat pump takes water from the ground, extracts heat, then returns the water to the ground, usually via another well. For this installation, the discharge water is drained into a canal at the rear of the house. The supply water is approximately 6°C (43°F) and the return water approximately 2°C (36°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In the summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance (C.O.P.).

A Mammoth Sol. A Terra II Model 064 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.88 L/s (14 USGPM) the rated output of this heat pump is 16.3 kW (55,600 Btu/hr) for heating and 21.6 kW (73,800 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 2.83 for the above conditions including a well pump requirement of 960 W per L/s (60 W per USGPM).

This system should provide a savings of 65% based on electricity. For a $1200.00/year heating cost, the savings should be approximately $780.00/year providing a simple payback of 11.5 years.

The purpose of this project is to demonstrate the economics of operating this type of system.

No. 973
Region: East Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

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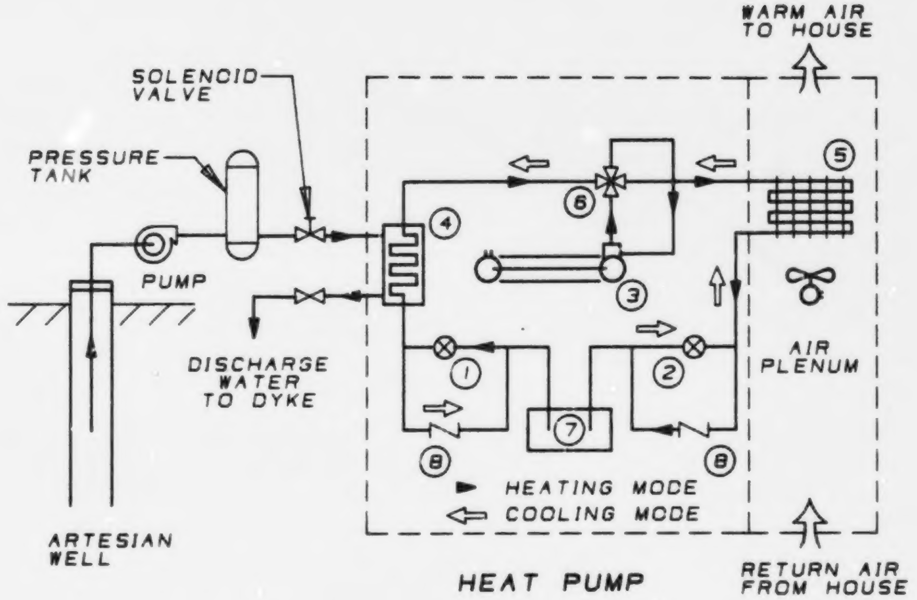
WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
PUMP
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⑧
DISCHARGE WATER TO DYKE
AIR PLENUM
HEATING MODE
COOLING MODE
ARTESIAN WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE

ARTESIAN WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:

Mr. Emil Lecocq

Technology:

Heat Pump

Project Location:

Box 246
Ile des Chenes, Manitoba R0A 0T0

(204) 878-3011

Project Cost: $10,262.00

Small Scale Support: $6,872.00

Simple Payback Period:

14 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This ground water heat pump installation provides heating for a single family dwelling. The 102 mm (4 in) diameter supply well is 35 m (115 ft) deep and the 102 mm (4 in) diameter discharge well is 28 m (91 ft) deep. The existing electric furnace serves as a back-up.

A ground water heat pump takes water from the ground, extracts heat, then returns the water to the ground, usually via another well. Typically, the supply water is approximately 6°C (43°F) and the return water approximately 3°C (37°F). The heat removed from the water is upgraded by the heat pump for distribution in the house. In the summer, the heat pump can be reversed to provide cooling.

Heat pumps run on electrical energy. Generally, for each unit of electrical energy provided to the heat pump, about three equivalent units of heat energy are supplied to the house. The ratio of "energy out to energy in" is known as the coefficient of performance. (C.O.P.).

A Friedrich 805/060 heat pump is used for this installation. At a water supply temperature of 7°C (45°F) and a water flow of 0.88 L/s (14 USGPM) the rated output of this heat pump is 15.7 kW (53,600 Btu/hr) for heating and 21.1 kW (72,000 Btu/hr) for cooling. This is based on an air entering temperature of 21°C (70°F) for heating and 27°C (80°F) for cooling. The C.O.P. for heating is given as 3.1 for the above conditions. The C.O.P. does not include the well pump energy requirements. The heat pump is equipped with a water flow meter and water thermometers.

One feature of this heat pump installation is the heat exchanger for domestic water heating. (This feature does not exist anymore. However the schematic still shows it).

This system should provide a savings of 65% based on electricity. For a $1100.00 per year heating cost, the savings should be approximately $715.00/year providing a simple payback of 14 years.

The purpose of this project is to demonstrate the economics of operating this type of system.

No. 974
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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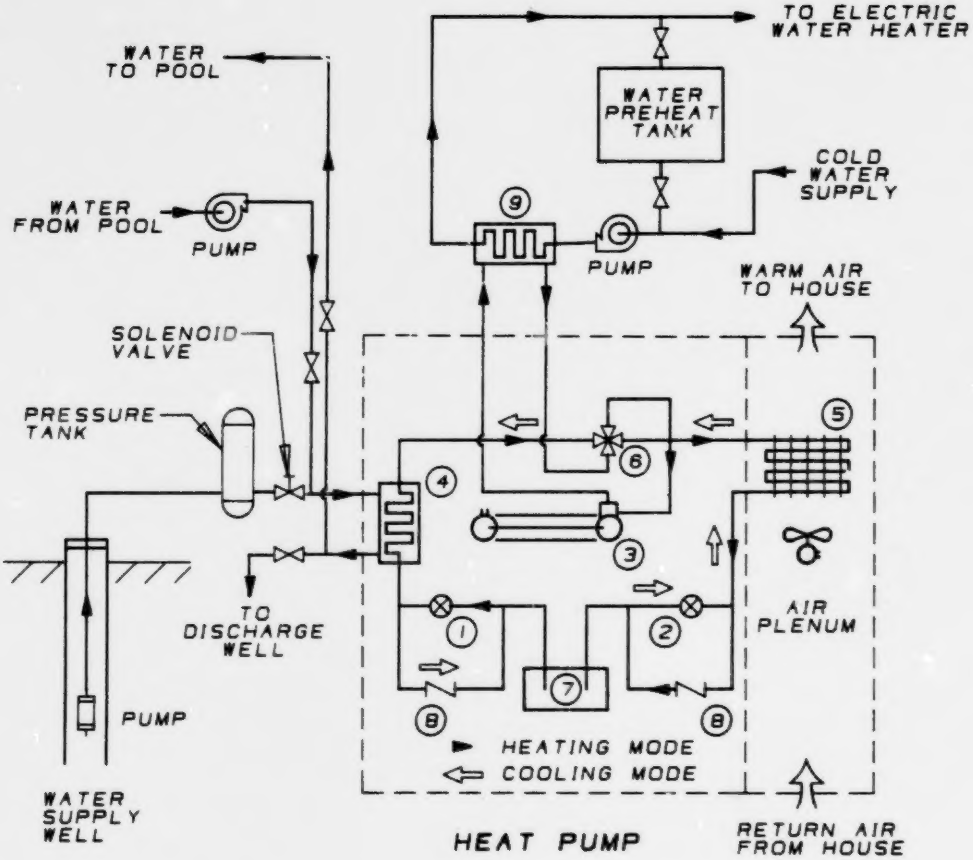
TO ELECTRIC WATER HEATER
WATER TO POOL
WATER PREHEAT TANK
COLD WATER SUPPLY
WATER FROM POOL
PUMP
9
PUMP
WARM AIR TO HOUSE
SOLENOID VALVE
PRESSURE TANK
5
6
4
3
TO DISCHARGE WELL
1
2
AIR PLENUM
7
8
8
PUMP
HEATING MODE
COOLING MODE
WATER SUPPLY WELL
HEAT PUMP
RETURN AIR FROM HOUSE

LEGEND

① HEATING MODE EXPANSION VALVE
② COOLING MODE EXPANSION VALVE
③ REFRIGERANT COMPRESSOR
④ HEATING MODE EVAPORATOR / COOLING MODE CONDENSER
⑤ HEATING MODE CONDENSER / COOLING MODE EVAPORATOR
⑥ HEATING/COOLING MODE REVERSING VALVE
⑦ LIQUID REFRIGERANT RECEIVER
⑧ CHECK VALVE
⑨ DOMESTIC WATER HEAT EXCHANGER

TWO WELL GROUND WATER
HEAT PUMP INSTALLATION

Energy Ideas.

Project Proponent:

Austin Curling Rink

Technology:

Heat Recovery — Refrigeration

Project Location:

Prairie Designs Inc.
105 Arlington Street
Winnipeg, Manitoba R3G 1Y3

(204) 772-2994

Project Cost: $20,094.00

Small Scale Support: $7,500.00

Simple Payback Period:

3.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This refrigeration waste heat recovery system provides heating to a curling rink lobby and the ice area space. The newly built curling rink has two sheets of ice.

The ice is kept frozen by circulating chilled brine through piping under the ice surface. The warmed return brine is then rechilled by a refrigeration system. In a conventional ice plant, the refrigerant picks up the heat from the brine, is compressed, and then releases the superheat and heat of condensation to the outside air by means of a condenser.

In this installation, a water cooled condenser transfers heat from the refrigerator to water in a 54,545 L (12,000 Imp. gal.) concrete storage cistern. Upon reaching a water temperature of 27°C (80°F) in the cistern, a control valve switches the refrigerant to a parallel outdoor air cooled condenser.

A Mammoth Sol. A. Terra II Model 035 heat pump, utilizing the cistern water as its source, upgrades the stored heat and distributes it via ducts to the lobby.

The ice area space is maintained at approximately 0°C (32°F) and heated directly by the cistern water through a heat exchanger. Water flows continuously through this loop to prevent its freezing. A fan in the heat exchanger duct controlled by a thermostat is switched off when the water temperature drops below 16°C (60°F). Supplementary heating to the ice area is provided as required by 2 — 5 kW electric heaters on thermostat control.

This installation is for a new building and therefore no historic energy costs data for heating is available. However, it is estimated that this installation will save $6,000/year in heating costs, providing a simple payback of 3.5 years.

The purpose of this project is to demonstrate the economics of operating this type of system.

No. 976
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada

Energy, Mines and Resources Canada
Energie Mines et Ressources Canada

Manitoba
Energy and Mines

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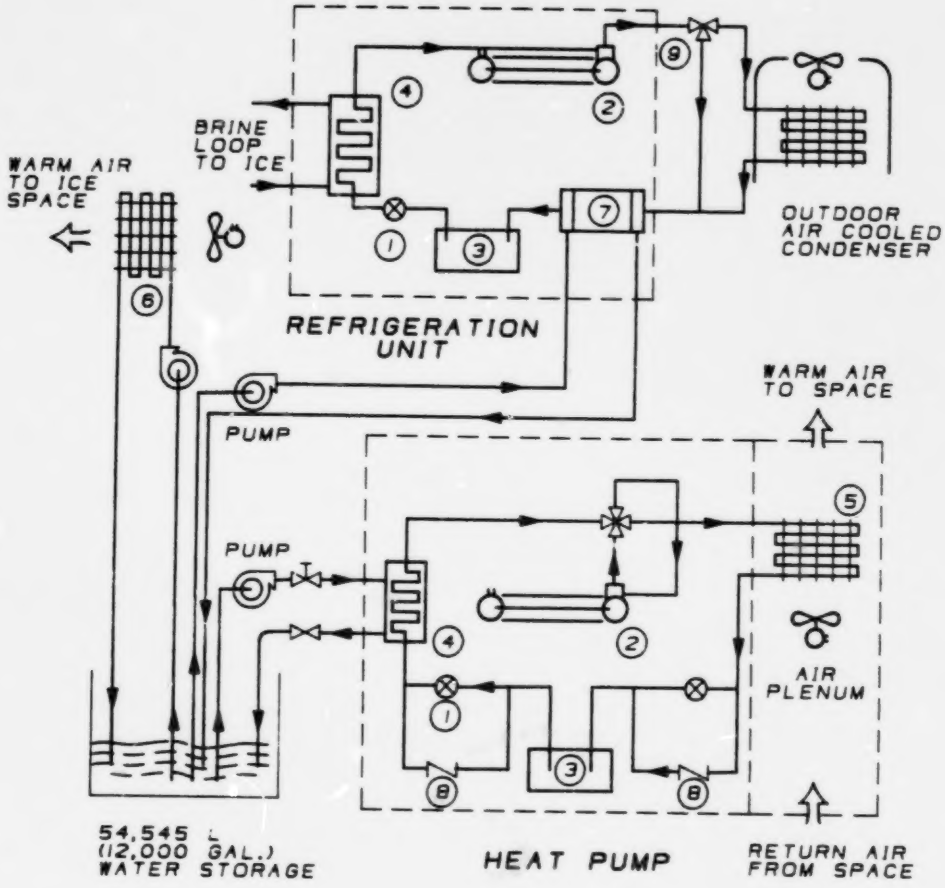

BRINE LOOP TO ICE
WARM AIR TO ICE SPACE
OUTDOOR AIR COOLED CONDENSER
REFRIGERATION UNIT
PUMP
PUMP
WARM AIR TO SPACE
AIR PLENUM
54,545 L (12,000 GAL.) WATER STORAGE
HEAT PUMP
RETURN AIR FROM SPACE
①
②
③
④
⑤
⑥
⑦
⑧
⑨

LEGEND

① EXPANSION VALVE
② REFRIGERANT COMPRESSOR
③ LIQUID REFRIGERANT RECEIVER
④ EVAPORATOR
⑤ CONDENSER
⑥ WATER/AIR HEAT EXCHANGER
⑦ WATER COOLED CONDENSER
⑧ CHECK VALVE
⑨ THREE-WAY VALVE

REFRIGERATION HEAT RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:
Crystal City Community Centre

Technology:
Heat Recovery — Refrigeration

Project Location:
Crystal City, Manitoba R0K 0N0
(204) 873-2245

Project Cost: $10,422.00
Small Scale Support: $7,500.00

Simple Payback Period:
3 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This refrigeration heat recovery system provides the primary water heating requirements for an arena. The hot water is used mainly for ice surfacing.

The arena ice is kept frozen by circulating chilled brine through piping under the ice surface. The warmed return brine is then rechilled by a refrigeration system. In a conventional ice plant, the refrigerant picks up the heat from the brine, is compressed, and then releases the superheat and heat of condensation to the outside air by means of a condenser.

In this project installation, a Therma-Stor II heat recovery unit is connected in series between the compressor and condenser with a controlled refrigerant bypass. This allows the unit to operate at full capacity without overloading the compressors. It is designed to recover a portion of the refrigerant heat for water heating and has a maximum rating of 29.3 kW (100,000 Btu/hr). The heat recovery unit has a 455 L (100 Imp. gal) water storage capacity and is linked to a 2270 L (500 Imp. gal) holding tank providing extra storage. The existing 54 kW electric water heater remains as a back-up and supplementary heater.

It is estimated that this system will save up to $3,500.00/year in electrical energy consumption and demand charges. This should result in a simple payback of three years.

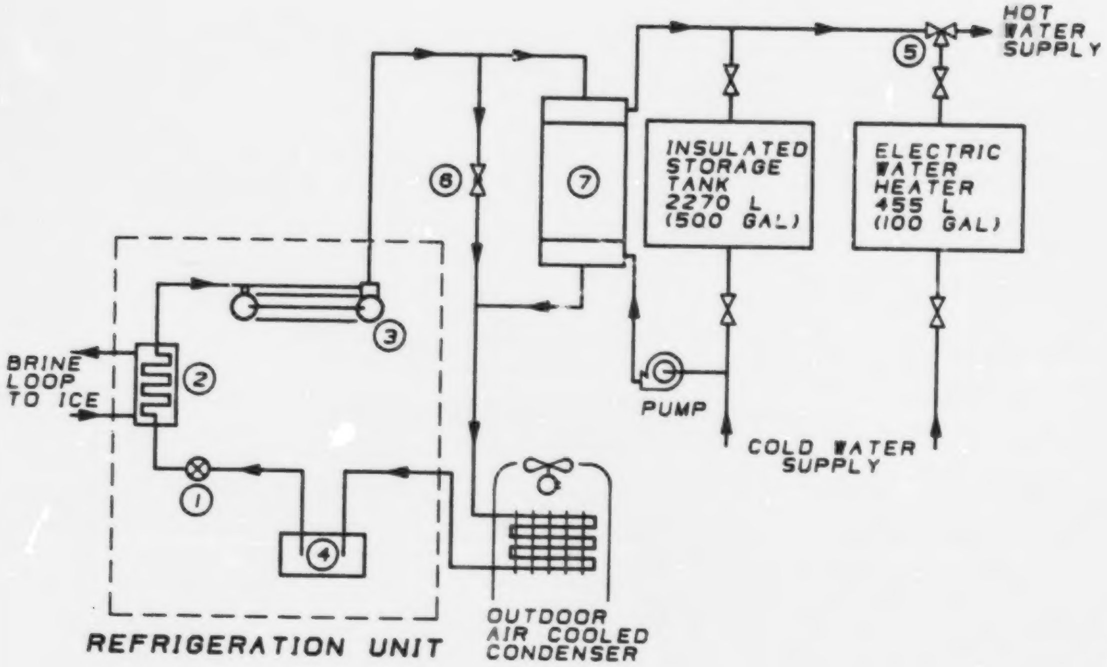
The purpose of this project is to demonstrate the economics of operating this type of system.

No. 979
Region: South Western

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon. Wilson D. Parasiuk, Minister


HOT WATER SUPPLY
⑤
INSULATED STORAGE TANK 2270 L (500 GAL)
ELECTRIC WATER HEATER 455 L (100 GAL)
⑥
⑦
③
BRINE LOOP TO ICE
②
PUMP
COLD WATER SUPPLY
①
④
REFRIGERATION UNIT
OUTDOOR AIR COOLED CONDENSER

LEGEND

① EXPANSION VALVE
② EVAPORATOR
③ REFRIGERANT COMPRESSOR
④ LIQUID REFRIGERANT RECEIVER
⑤ MANUAL THREE-WAY VALVE
⑥ REFRIGERANT BY-PASS VALVE
⑦ THERMA-STOR II HEAT RECOVERY UNIT

REFRIGERATION HEAT RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:
St. Vital Curling Club

Technology
Heat Recovery — Refrigeration

Project Location:

Box 66, St. Vital P.O.
Winnipeg, Manitoba R2M 4A5

(204) 256-3623

Project Cost: $12,506.00

Small Scale Support: $7,500.00

Simple Payback Period
4 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This refrigeration waste heat recovery system provides heating to the ice area space of a curling rink. The curling rink has 6 sheets of ice.

The ice is kept frozen by circulating chilled brine through piping under the ice surface. The warmed returned brine is then rechilled by a refrigeration system. In a conventional ice plant, the refrigerant picks up the heat from the brine, is compressed, and then releases the superheat and heat of condensation to the outside air by means of a condenser.

In this installation, a water cooled condenser is connected in parallel to the existing outdoor evaporative condenser. Water in the condenser loop picks up heat from the refrigerant and transfers it to the ice area space by a water to air heat exchanger. The water is circulated continuously by a pump to prevent freezing. A thermostat in the ice area space, set at approximately 0°C (32°F), controls the fan in the heat exchanger duct.

It is estimated that this system will provide up to 369 GJ (3.5×10^8 Btu) per year for ice area space heating presently being met by 4 electric unit heaters. At present day electrical energy costs, this is equivalent to a savings of $3,076/year, resulting in a simple payback of 4 years.

The purpose of this project is to demonstrate the economics of operating this system.

MG 12505

No. 980
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

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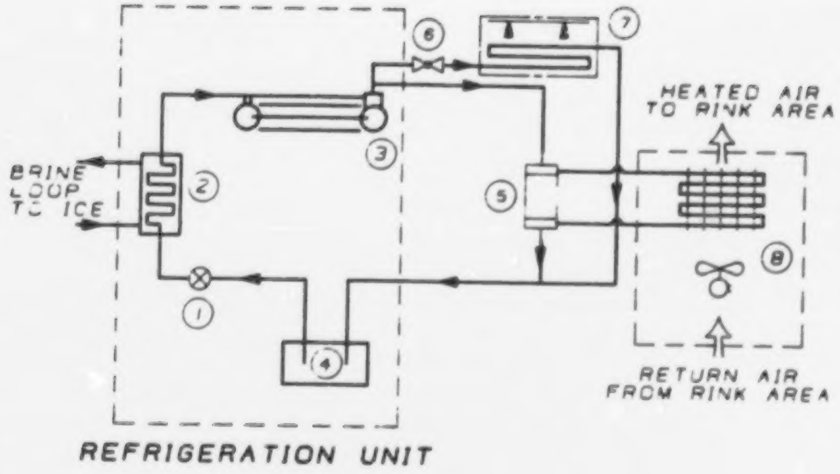
⑥
⑦
HEATED AIR TO RINK AREA
③
BRINE LOOP TO ICE
②
⑤
⑧
①
④
RETURN AIR FROM RINK AREA
REFRIGERATION UNIT

LEGEND

① EXPANSION VALVE
② EVAPORATOR
③ REFRIGERANT COMPRESSOR
④ LIQUID REFRIGERANT RECEIVER
⑤ WATER COOLED CONDENSER
⑥ REFRIGERANT BY-PASS VALVE
⑦ EVAPORATIVE CONDENSER
⑧ WATER TO AIR HEAT EXCHANGER

CURLING RINK
REFRIGERATION HEAT
RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:

Deloraine/Winchester Arena

Technology

Heat Recovery — Refrigeration

Project Location:

Box 510
Deloraine, Manitoba R0M 0M0

(204) 747-2655

Project Cost: $21,795.00

Small Scale Support: $7,500.00

Simple Payback Period

4 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This refrigeration heat recovery system provides heating to the ice area space of the arena. The arena walls and roof are insulated with 25 mm (1 in) of glass fibre insulation providing a R-3.5 value.

The arena ice is kept frozen by circulating chilled brine through piping under the ice surface. The warmed return brine is then rechilled by a refrigeration system. In a conventional ice plant, the refrigerant picks up the heat from the brine, is compressed, and then releases the superheat and heat of condensation to the outside air by means of a condenser.

For this project, a Keeprite Model KCC-III heat recovery unit, with a nominal capacity of 123 kW (416,000 Btu/hr) was installed in the refrigeration hot gas line between the compressor and outdoor condenser. This system recovers a portion of the Freon refrigerant superheat and heat of condensation and distributes it via ducts to the ice area space. A thermostat in this space, set at approximately 0°C (32°F), controls the fan on the heat recovery unit. The fan is also interlocked with the compressor to prevent operation during the refrigeration off-cycle.

The heat distribution system will be extended to the dressing and tractor room areas later.

Previously, the ice area space was not heated and therefore there is no historic energy cost data available for heating. However, the estimated cost for heating this space with conventional fuels is $6,000.00/year providing a simple payback of 4 years.

The purpose of this project is to demonstrate the economics of operating of this type of facility.

No. 981
Region: South Western

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy Mines and Resources Canada
Énergie Mines et Ressources Canada
Hon. Jean Chrétien Minister

MG-638 a

MANITOBA
DEPARTMENT OF ENERGY AND MINES
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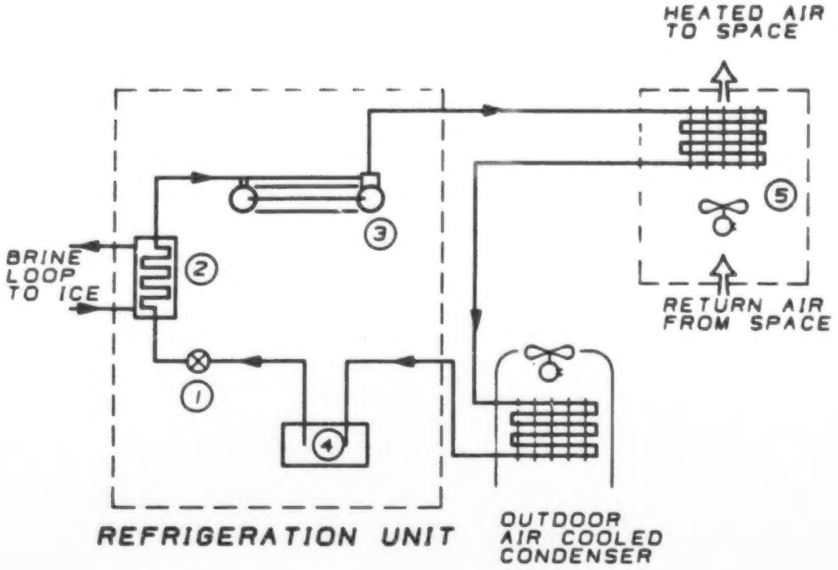

HEATED AIR TO SPACE
BRINE LOOP TO ICE
②
③
⑤
①
④
RETURN AIR FROM SPACE
REFRIGERATION UNIT
OUTDOOR AIR COOLED CONDENSER

LEGEND

① EXPANSION VALVE
② EVAPORATOR
③ REFRIGERANT COMPRESSOR
④ LIQUID REFRIGERANT RECEIVER
⑤ HEAT RECOVERY UNIT LOCATED IN ICE AREA SPACE

REFRIGERATION HEAT RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:

Brookdale Community Club

Technology:

Heat Recovery — Refrigeration

Project Location:

Brookdale, Manitoba R0K 0G0

(204) 354-2117

Project Cost: **$3,850.00**

Small Scale Support: **$1,925.00**

Simple Payback Period:

2.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This refrigeration heat recovery system provides heating to the ice area space of a curling rink containing two sheets of ice. The walls and ceiling of the curling rink are insulated to a R-20 value.

The curling rink ice is kept frozen by circulating chilled brine through piping under the ice surface. The warmed return brine is then rechilled by a refrigeration system. In a conventional ice plant, the refrigerant picks up the heat from the brine, is compressed, and then releases the superheat and heat of condensation to the outside air by means of a condenser. Freon is used in this system.

In this installation, a Model KCC 104 Keeprite heat recovery unit is located in the ice area space and connected between the compressor and outdoor condenser. This system recovers a portion of the refrigerant superheat and heat of condensation and delivers it to the ice area space. A thermostat in this space set at approximately 0°C (32°F) controls the fan on the heat recovery unit. This fan is also interlocked with the compressor to prevent operation during the refrigeration off cycle.

It is estimated that this installation will eliminate the $1,700/year cost of heating this area with propane, providing a simple payback of 2.5 years.

The purpose of this project is to demonstrate the economics of operating this type of facility.

No. 982
Region: South Western

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

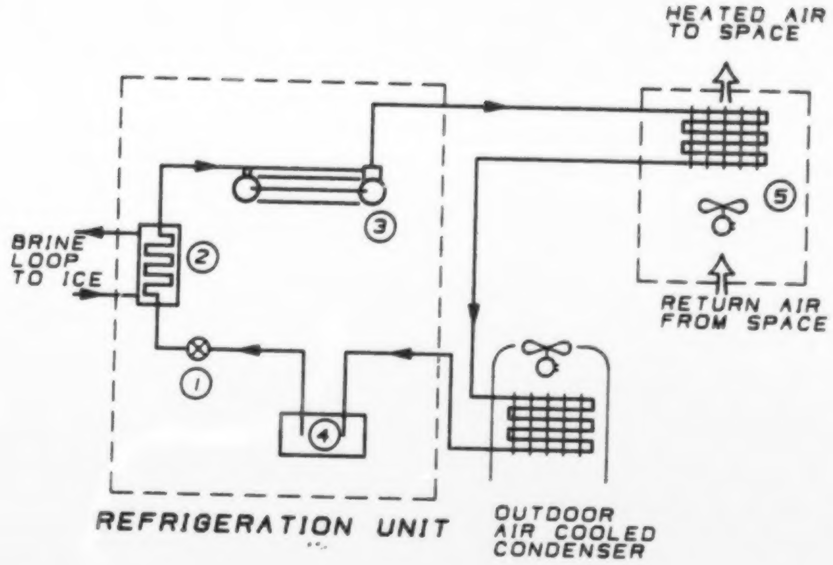
Canada

Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada
Hon. Jean Chretien, Minister

MG-638"a"

MANITOBA

DEPARTMENT OF ENERGY AND MINES
Hon Wilson D. Parasiuk, Minister


HEATED AIR TO SPACE
BRINE LOOP TO ICE
2
3
5
1
4
RETURN AIR FROM SPACE
REFRIGERATION UNIT
OUTDOOR AIR COOLED CONDENSER

LEGEND

① EXPANSION VALVE
② EVAPORATOR
③ REFRIGERANT COMPRESSOR
④ LIQUID REFRIGERANT RECEIVER
⑤ HEAT RECOVERY UNIT LOCATED IN ICE AREA SPACE

REFRIGERATION HEAT
RECOVERY INSTALLATION

Energy Ideas.

Project Proponent:
Mr. J. Wilson

Technology:
Solar Greenhouse

Project Location:
Lincoln School
3180 McBey Avenue
Winnipeg, Manitoba R3K 0T7

(204) 887-8397

Project Cost: $25,103.00

Small Scale Support: $7,500.00

Simple Payback Period:
84 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This 3.7 x 11 m (12 x 36 ft) solar greenhouse, attached to the south wall of a public school, provides a conducive environment for plant growth for the school horticultural program.

The greenhouse is constructed on a concrete grade beam and has a concrete slab floor. The end walls are framed with 51 x 152 mm (2 x 6 in) nominal studding. The walls are insulated with 152 mm (6 in) thick glass fibre providing a R-20 insulating value; and the roof is insulated with 305 mm (12 in) thick glass fibre providing a R-40 insulating value. The concrete floor and foundation perimeter are insulated with rigid polystyrene providing a R-12 insulating value. A double layer of 4 mil polyethylene air/vapour barrier is applied over the interior insulation surface. Both the interior and exterior wall surfaces are sheeted with 12.7 mm (0.5 in) thick plywood.

The south wall of the greenhouse is glazed with 26.8 m^2 (288 ft^2) of Kalwall double-glazed glass fibre reinforced plastic insulation panels. The vertical panels are spaced 38 mm (1.5 in) apart and provide an insulating value of R-2.2.

A thermostatically controlled exhaust fan dumps excess heat to the outdoors during the summer months.

The estimated energy cost savings of this installation compared to a conventional greenhouse is approximately $300/year, resulting in a simple payback of 84 years.

The purpose of this project is to demonstrate the economics of operating this type of facility.

MG 12213

No. 983
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"

Energy Ideas.

Project Proponent:

Brandon General Hospital

Technology:

Solar Greenhouse

Project Location:

150 McTavish Avenue, East
Brandon, Manitoba R7A 2B3

(204) 726-2243

Project Cost: $24,695.00

Small Scale Support: $7,500.00

Simple Payback Period:

28 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This greenhouse project provides a conducive environment for year round plant growth for a general hospital. The plants are used in patient rooms, sitting rooms and other areas of the hospital. The sun is the primary source of heat and light for this installation.

The 6.4 x 7.8 m (21 x 25.6 ft) greenhouse is situated along the south wall of the hospital power room and has a plant growth and storage/work area. The storage/work area has a 152 mm (6 in) concrete slab floor and the growing area has a stone floor. The walls are framed with 51 x 152 mm (2 x 6 in) nominal lumber with plywood sheathing. The walls and ceiling are insulated with 152 mm (6 in) glass fiber insulation providing a R-20 value. A polyethylene air/vapour barrier is used on the walls and ceiling. The south wall of the greenhouse is glazed with thermopane window panels covering 28 m² (300 ft²) at 50° to the horizontal.

An active solar system inside the greenhouse collects and stores heat. The collector consists of plastic pipes attached to the inside back wall which is painted black. Water is pumped from storage tanks through the pipes in a closed loop. The pump is controlled thermostatically. Supplementary heating is supplied by waste heat from the boiler room.

The estimated annual energy cost savings for this installation over conventional greenhouses is $900.00/year providing a simple payback of 28 years.

The purpose of this project is to confirm the economics of operating this type of installation.

No. 984
Region: South Western

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada

Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"

Energy Ideas.

Project Proponent: Mr. Gerhard Dekker	Technology: Windmill
Project Location: Box 3 Pansy, Manitoba R0A 1J0	(204) 434-6143
Project Cost: $823.00 Small Scale Support: $610.00	Simple Payback Period: 5.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This windmill installation provides electrical energy for lights and radio for a remote dwelling. There is no utility electrical power at the site.

A home built horizontal axis wind generator mounted on an 11 m (36 ft.) tower is used for this installation. The two bladed 1.8 m (6 ft.) diameter wooden propeller has a tip to wind speed ratio of approximately 7:1. The windmill has a tail fin, operates upwind, and has overspeed protection.

For this installation a 12 V automotive alternator is driven directly by the propeller. The armature is rewound to four times the original number of windings. Conductors from the alternator are connected through slip rings.

The rectified output from the alternator provides trickle charging to a 12 V, 100 amp-hour lead acid battery. For a 40 km/h (25 mph) wind speed, the output from the wind generator is approximately 40 W.

This system should provide an output of up to 50 kWh per month. The cost of generating electricity using a portable engine driven generator unit is aproximately 25¢/kWh. Therefore, this system should provide a savings of up to $150.00/year resulting in a simple payback of 5.5 years.

The purpose of this project is to demonstrate the economics of operating this type of facility.

No. 985
Region: South Eastern

MG 12214

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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Energy, Mines and Resources Canada
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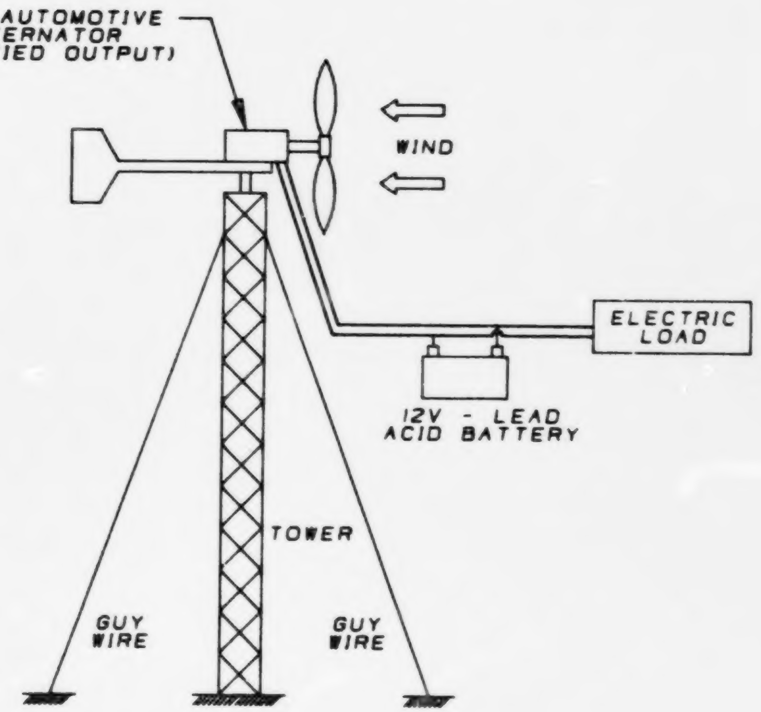
12V - AUTOMOTIVE ALTERNATOR (RECTIFIED OUTPUT)
WIND
ELECTRIC LOAD
12V - LEAD ACID BATTERY
TOWER
GUY WIRE
GUY WIRE

WINDMILL INSTALLATION

Energy Ideas.

Project Proponent: Maskwa Project	Technology: Windmill

Project Location:
c/o Mr. Randy Boehem
125 Luxton Avenue
Winnipeg, Manitoba R2W 0L8
(204) 586-7209

Project Cost:	$9,370.00	Simple Payback Period: 19 years
Small Scale Support:	$6,500.00	

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This windmill installation provides electrical power for a conference-retreat centre. There is no utility electrical power at the site.

A BWC 1000 wind powered electric generator on a 27.4 m (90 ft) tower is used for this installation. The unit features a fibreglass reinforced plastic 2.8 m (9.2 ft) diameter three-bladed rotor. The pitch angles of the torsionally flexible blades are automatically adjusted by centrifugal forces on weights attached forward of the leading edge of each blade. This provides for improved aerodynamic performance over the entire wind speed operating range. Overspeed protection is provided by the tail assembly yaw control which turns the rotor partially out of the wind at speeds greater than 51.2 km/h (32 mph). Cut-in wind speed is 14.4 km/h (9 mph) and maximum design wind speed is 192 km/h (120 mph).

A permanent magnet alternator is directly driven by the rotor. Maximum rated power output is 1.2 kW at a 48 km/h (30 mph) wind speed. Electrical output is a rectified 24 VDC.

Eight Varta P-125 6 volt light industrial batteries provide electrical energy storage. An EMS-4 energy management system monitors battery conditions and performs a variety of switching functions to avoid battery overcharge or deep discharge conditions. It controls secondary loads and conventional back-up gasoline powered generators and displays overall system status.

An inverter connected to the DC system supplies 117 VAC power. The inverter is capable of operating in synchronization with a utility power grid.

It is estimated that this system will provide up to 2000 kWh of electricity per year under average wind conditions of 16 km/h (10 mph). The cost for generating electricity using a gasoline engine powered motor-generator unit is approximately 25¢/kWh. Therefore this system should provide a savings of up to $500/year resulting in a simple payback of 19 years.

The purpose of this project is to demonstrate the economics of operating this type of facility.

No. 986
Region: East Central

MG 12507

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
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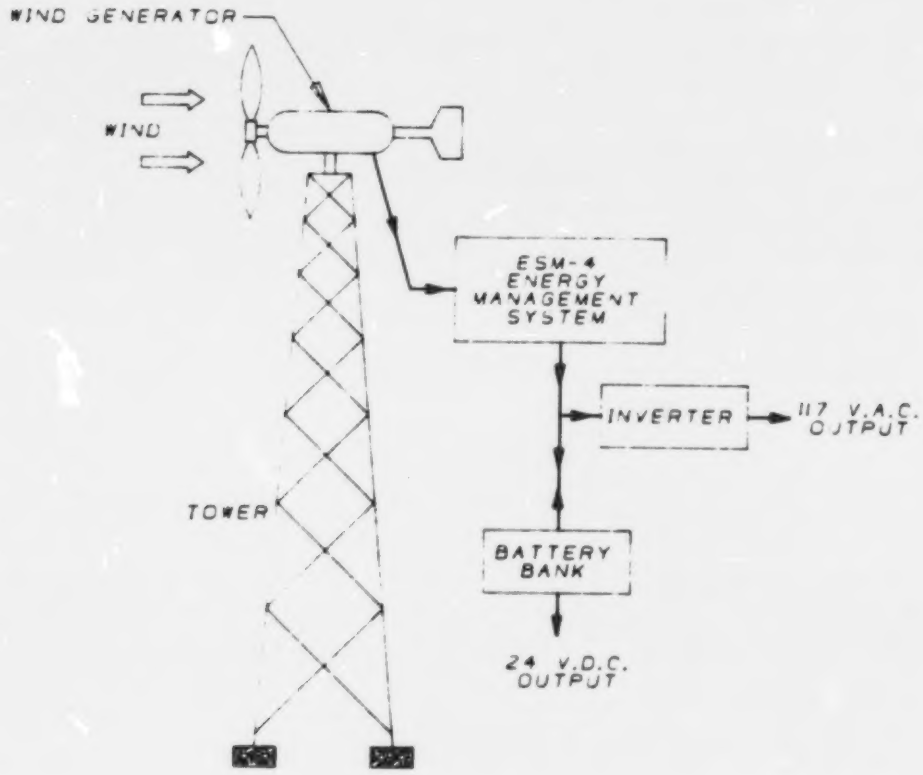
WIND GENERATOR
WIND
ESM-4 ENERGY MANAGEMENT SYSTEM
INVERTER
117 V.A.C. OUTPUT
TOWER
BATTERY BANK
24 V.D.C. OUTPUT

WINDMILL INSTALLATION

Energy Ideas.

Project Proponent:	**Technology:**
Mr. W.R. Erickson	Windmill

Project Location:

Box 69
Churchill, Manitoba R0B 0E0

(204) 675-8866

Project Cost:	$10,858.00	Simple Payback Period:
Small Scale Support:	$7,500.00	7 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This windmill installation provides electrical energy for heating a greenhouse. The electrical energy, produced year round, is stored as heat in a rock storage bed to be used for extending the growing season by 3 months. The heat storage provides a better match between the energy output of the windmill and the heating requirements of the greenhouse.

The 6.1 x 7.3 m (20 x 24 ft) greenhouse is of wood frame construction with the walls insulated to RSI 2.1 (R-12) and the roof to RSI 3.5 (R-20). The double glaze south wall covers an area of 29 m² (312 ft²).

The rock storage area containing 89 m³ (3150 ft³) of rock is 5.2 x 9.8 m (17 x 32 ft) and of wood frame construction. The side walls are insulated to RSI 10.6 (R-60) and the back wall to RSI 7.0 (R-40). The rock storage area is attached to the back of the greenhouse and separated by a wall insulated to RSI 3.5 (R-20). The floor is insulated with rigid polyurethane and insulated steel panels providing an approximate RSI 2.6 (R-15).

A Hummingbird Model 4000-22 horizontal axis wind powered electric generator on a 12.8 m (42 ft) tower is used for this installation. The unit features epoxy resin polyurethane foam core 4.27 m (14 ft) diameter three-bladed fixed pitch rotor. The windmill operates upwind and has overspeed protection. Shutdown is accomplished by dynamic braking. Cut-in wind speed is 12.8 km/h (8 mph) and shut-down wind speed is 96 km/h (60 mph). A vane yaw control also limits the rotor speed. Maximum rated output is 8 kW at a 44.8 km/h (28 mph) wind speed. Generator electrical output is 3 phase AC which is rectified to 110 VDC.

The output is connected to electrical resistance heating elements enclosed in pipes at the bottom of the rock bed. Heat from the rock bed is transferred to the greenhouse by a thermostatically controlled fan.

It is estimated that this windmill will generate an average of 9000 kWh/year of electrical energy based on an average wind speed of 24 km/h (15 mph) for the area. At local electrical energy costs the savings should be approximately $1,620/year providing a simple payback of 7 years.

The purpose of this project is to demonstrate the economics of operating this installation.

No. 987
Region: Northern

MG-1250b

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Manitoba
Energy and Mines

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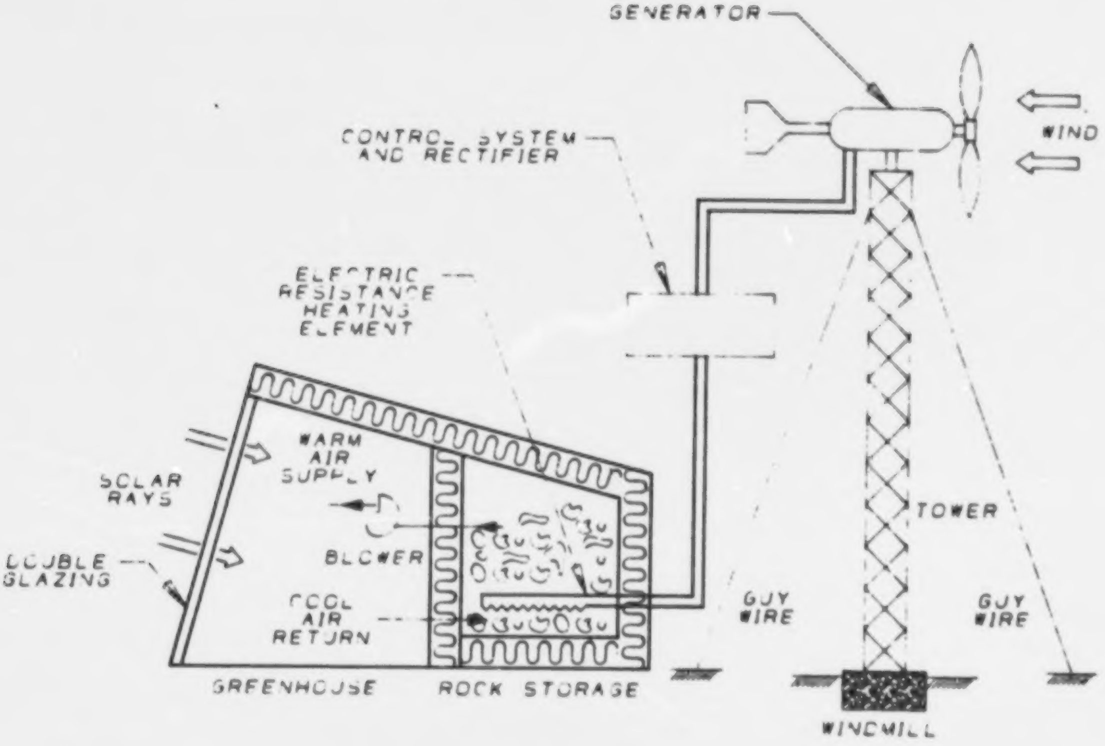

GENERATOR
WIND
CONTROL SYSTEM AND RECTIFIER
ELECTRIC RESISTANCE HEATING ELEMENT
WARM AIR SUPPLY
SOLAR RAYS
DOUBLE GLAZING
BLOWER
COOL AIR RETURN
TOWER
GUY WIRE
GUY WIRE
GREENHOUSE
ROCK STORAGE
WINDMILL

WINDMILL INSTALLATION

Energy Ideas.

Project Proponent: Lac du Bonnet/District Arena

Technology: Energy Management

Project Location:

Box 854
Lac du Bonnet, Manitoba R0E 1A0

(204) 345-2619

Project Cost: $8,573.00

Small Scale Support: $6,430.00

Simple Payback Period: 2 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This energy management system provides for the reduction of electrical energy use and demand of an arena. The work performed under this project is based on the recommendations of a Manitoba Hydro energy audit.

The electrical energy is reduced by replacing the incandescent lighting requiring 40 kW, with metal halide lighting requiring 10.8 kW. Also, 72 kW of water heaters, no longer required, are disconnected.

The remaining electrical energy loads are interlocked to reduce energy demand. Ten kW of the 15 kW electric furnace in the basement storage area is interlocked with the 20 kW furnace in the upstairs lounge area giving priority to the 20 kW furnace. The 54 kW water heater is interlocked with the 60 kW (80 hp) refrigeration compressors given priority to the compressors. The 10 kW unit heater is interlocked with a 12.5 kW duct heater in the tractor room. Priority is given to the unit heater.

In addition to the above the total heating system is interlocked with the compressors so that the heating system is off when both compressors are running.

The estimated savings in energy use and demand charges for this project is $5,000.00/year resulting in a simple payback of two years.

The purpose of this project is to demonstrate the economics of operating this type of facility.

No. 988
Region: East Central

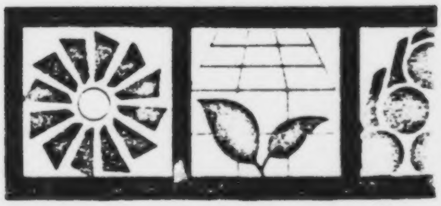
Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada
Hon. Jean Chrétien, Minister

MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon. Wilson D. Parasiuk, Minister

Energy Ideas.



Project Proponent: Young Men's Christian Association of Metropolitan Winnipeg	Technology: Energy Management
Project Location: c/o South Family Branch YMCA 5 Fermor Avenue Winnipeg, Manitoba R2M 0Y0	(204) 233-3476
Project Cost: $9,926.00 Small Scale Support: $7,440.00	Simple Payback Period 1.5 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This energy management system controls the heating and ventilation functions of a YMCA building based on occupancy hours. Previously, this system operated 24 hours a day. The work performed under this project is based on the recommendation of an energy audit performed by Manitoba Energy and Mines.

Three Honeywell microprocessor based controllers are used in this installation. The microprocessors control the heating to the gymnasium, office and social areas of the building based on occupancy hours and temperature requirements. The system is designed to reduce the overall building energy usage.

The estimated savings from this facility is $7,000.00 per year which is approximately 18% of the total energy use, resulting in a simple payback of 1.5 years.

The purpose of this project is to demonstrate the economics of operating this type of facility.

No. 989
Region: Winnipeg

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada
Hon. Jean Chretien, Minister
MG-638"a"

MANITOBA
DEPARTMENT OF ENERGY AND MINES
Hon Wilson D. Parasiuk, Minister

Energy Ideas.

Project Proponent:
Mr. Michael Ganczar

Technology:
Wood

Project Location:
541 Harstone Road
Winnipeg, Manitoba R3R 1C8
(204) 837-8756

Project Cost: $2,060.00
Small Scale Support: $870.00

Simple Payback Period:
N/A

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This project consists mainly of organizing a 24.3 ha (60 acre) woodlot into a commercial harvesting operation for firewood. The woodlot contains a ratio of approximately 75% white poplar to 25% oak. The land is marginal and stony, making it unsuitable for grain farming.

In this project, strips 4.6 m (15 ft) wide every 30.5 m (100 ft) are cleared for easy access and controlled harvesting. Only dead and mature trees shall be cut, allowing the smaller trees to mature. Also, it is intended to replace harvested trees with fast growing hybrid poplars. This should provide a continuous yield of firewood on a long term basis.

The woodlot contains approximately 107 m^3/ha (18 cords/acre) of wood (1 cord being equivalent to approximately 85 ft^3 of solid volume). By harvesting 6 m^3/ha (1 cord/acre) annually, the yield will be approximately 144 m^3 (60 cords/year), providing gross revenues of $4,800/year based on an average price of $80/cord.

Sixty cords of wood in the 75/25 (poplar to oak) ratio should provide 600 GJ (6.3×10^8 Btu) of useful energy at an approximate cost of $8.00/GJ based on a 50% conversion efficiency and a 15% moisture content. This is equivalent to 22,060 L (4853 Imp. Gal) of fuel oil at an approximate cost of $12.90/GJ based on a 70% conversion efficiency.

The purpose of this project is to demonstrate the economics and commercial feasibility of this type of operation.

No. 990
Region: East Central

MG 12237

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

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Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

MG-638"a"

Energy Ideas.

Project Proponent:

Arco Holdings

Technology:

Geo-Thermal

Project Location:

706 Home St.
Winnipeg, Manitoba R3E 2C6

(204) 772-1526

Project Cost: $7,400.00

Small Scale Support: $5,550.00

Simple Payback Period:

63 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This geo-thermal system provides preheating of the ventilation air during the heating season and cooling during the summer season for a single family dwelling.

The system consists of a labyrinth type flow path on top of the concrete basement floor. The labyrinth is constructed of nominal 2 x 4 in lumber with a plywood floor on top. A polyethylene air/vapour barrier and 25.4 mm (1 in) polystyrene insulation is provided under the plywood floor.

Ventilation air, ducted from the outside, is drawn through the channels and preheated by the thermal energy stored in the earth. Heat is transferred from the earth through the concrete floor. The heated air is then supplied to the furnace return duct by a blower. During the summer, the outside ventilation air is cooled by heat transfer to the cooler earth.

Assuming that 25% of the heating costs are due to infiltration losses and that this system can recover up to 50% of these losses, then a 13% savings in heating costs is possible. For a $900.00/year heating cost, the estimated savings is $117.00/year providing a simple payback of 63 years. However, with summer cooling included, the simple payback may be slightly reduced.

The purpose of this project is to demonstrate the functional operation and confirm the economics of this type of facility.

No. 991
Region: Winnipeg

MG-12134

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada

Energy, Mines and Resources Canada
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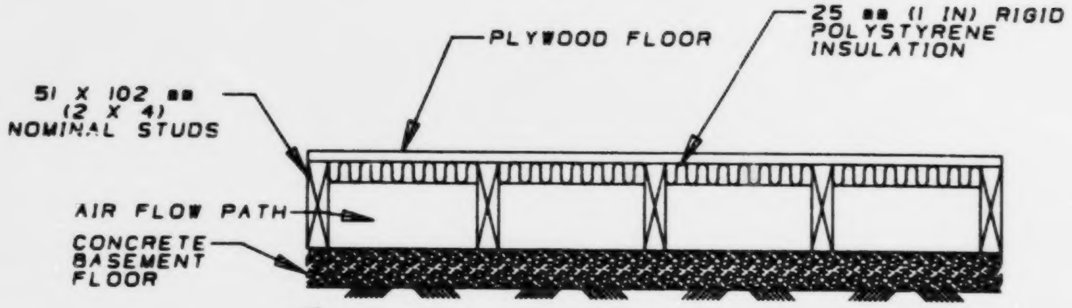
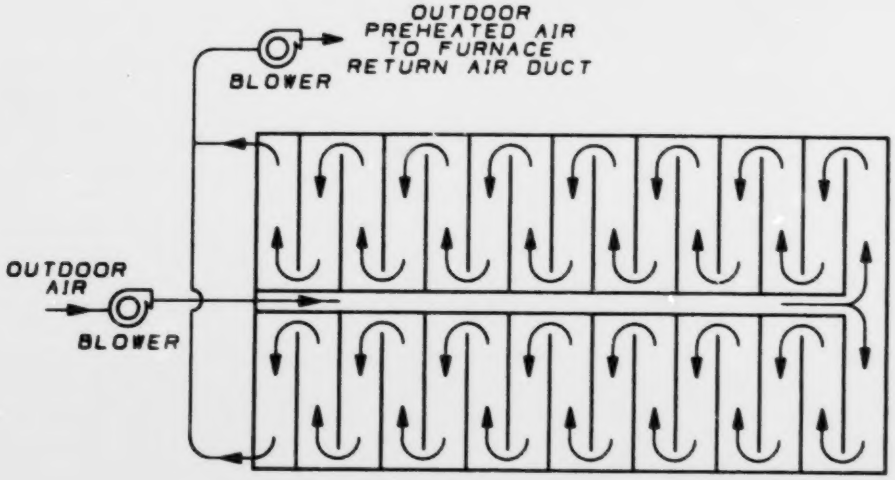


PLYWOOD FLOOR
25 mm (1 IN) RIGID POLYSTYRENE INSULATION
51 X 102 mm (2 X 4) NOMINAL STUDS
AIR FLOW PATH
CONCRETE BASEMENT FLOOR
EARTH

SIDE VIEW



OUTDOOR PREHEATED AIR TO FURNACE RETURN AIR DUCT
BLOWER
OUTDOOR AIR
BLOWER

LABYRINTH TYPE GROUND HEAT EXCHANGER

TOP VIEW

GEO-THERMAL INSTALLATION

Energy Ideas.

Project Proponent:

Mr. Dennis Walker

Technology:

Wood

Project Location:

Box 880
Portage la Prairie, Manitoba R1N 3C3

(204) 857-7794

Project Cost: $9,674.00

Small Scale Support: $2,800.00

Simple Payback Period:

13 years

SMALL SCALE ENERGY DEMONSTRATION PROGRAM

Description:

This wood-fired hot water floor radiant system provides the primary heating for a 297.4 m^2 (3200 ft^2) single family dwelling. A 35 kW electric water heater provides both supplementary and back-up heating.

A Jetstream series 120SB wood-fired hot water furnace is used for this installation. The furnace has a forced draft combustion chamber and is rated at 35.2 kW (120,000 Btu/hr). A thermostat sensing the water temperature in the jacket controls the primary forced air blower in an on-off mode, thus controlling the wood burn rate.

Water in the furnace jacket is circulated through a 6364 L (1400 Imp. Gal.) storage tank. The storage tank is constructed of treated wood with a double 6 mil polyethylene liner and is insulated with R-50 rigid polystyrene insulation.

A heat exchanger constructed of copper tubing and suspended in the storage tank, transfers heat from the water storage to the radiant heating loops. Three separate loops are used; one to the garage, one to the north basement area and one to the south basement area. Each loop consists of several parallel circuits of 13 mm (½ inch) diameter plastic pipe embedded in the basement concrete floor.

A thermostatically controlled mixing valve preset at approximately 43°C (110°F) controls the water temperature in the radiant loops by mixing a portion of the return water with the heated supply water.

This installation is for a new dwelling and therefore no historic heating cost data is available. It is estimated that it would cost approximately $1,200/year to heat this house electrically. The equivalent heating cost using wood and a 60% conversion efficiency is approximately $475/year thus providing a savings of $725/year and a simple payback of 13 years

The purpose of the project is to demonstrate the economics of operating this type of system.

MG 12229

No. 992
Region: South Central

Manitoba/Canada Conservation and Renewable Energy Demonstration Program

Canada
Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

Manitoba
Energy and Mines

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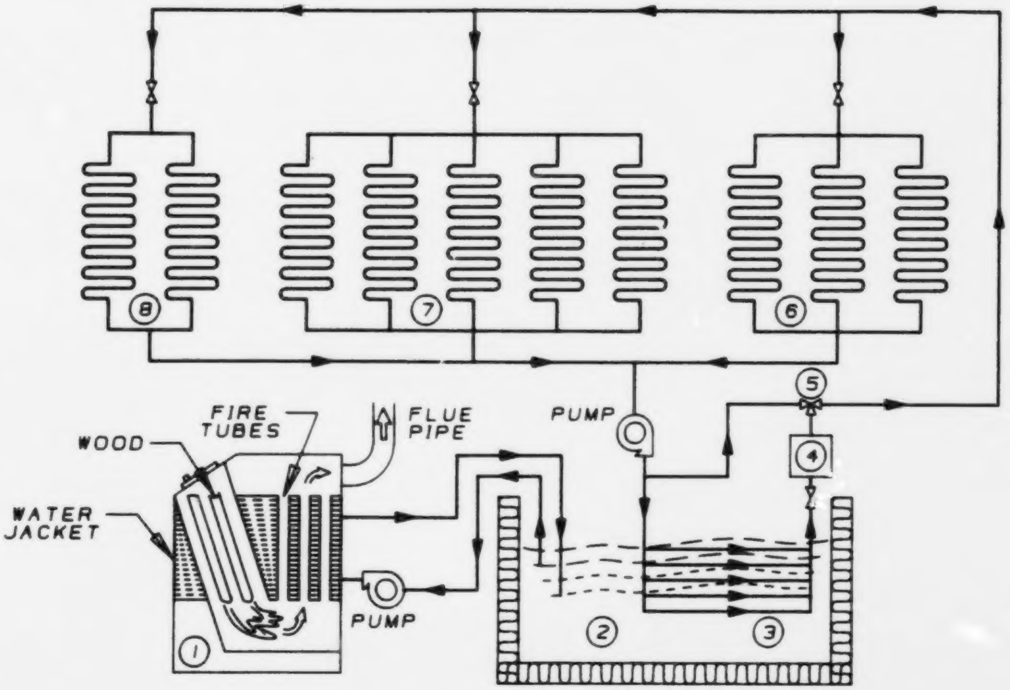
FIRE TUBES
FLUE PIPE
WOOD
WATER JACKET
PUMP
PUMP
1
2
3
4
5
6
7
8

LEGEND

1. WOOD-FIRED HOT WATER FURNACE
2. HOT WATER STORAGE TANK - 6364 L (1400 GAL)
3. WATER TO WATER HEAT EXCHANGER
4. ELECTRIC WATER HEATER - 35 KW
5. MIXING VALVE
6. SOUTH BASEMENT FLOOR RADIANT HEATING LOOP
7. NORTH BASEMENT FLOOR RADIANT HEATING LOOP
8. GARAGE FLOOR RADIANT HEATING LOOP

WOOD-FIRED HOT WATER RADIANT HEATING SYSTEM INSTALLATION